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FLOOD INSURANCE STUDY

CITY OF NEW BERLIN, WISCONSIN

WAUKESHA COUNTY

REVISED

JULY 4, 1988

COMPLETED

Federal Emergency Management Agency

COMMUNITY NUMBER - 550487

ORIGINAL

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

This publication incorporates revisions to the original Flood Insurance Study. These revisions are presented in Section 9.0.

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Flood Boundary and Floodway Map Index
Flood Boundary and Floodway Map

PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index
Flood Insurance Rate Map

FLOOD INSURANCE STUDY

CITY OF NEW BERLIN,
WAUKESHA COUNTY,
WISCONSIN

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of New Berlin, Waukesha County, Wisconsin, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound flood plain management. Minimum flood plain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydraulic analysis for Poplar Creek and the hydrologic and hydraulic analyses for Calhoun Creek were performed by Owen Ayres and Associates, Inc., for the Federal Emergency Management Agency (FEMA). The hydrologic analysis for Poplar Creek was taken from "A Comprehensive Plan for the Fox River Watershed" (Reference 1).

The hydrologic analysis for Deer Creek was provided by the Southeastern Wisconsin Regional Planning Commission (SEWRPC).

The hydrologic and hydraulic analyses for other streams studied were performed by Foth and Van Dyke of Madison, Incorporated (the Study Contractor) for FEMA, under Contract No. EMW-83-C-1177. This study was completed in December 1984.

1.3 Coordination

The study was coordinated with the U.S. Army Corps of Engineers (COE), U.S. Geological Survey, the Wisconsin Department of Natural Resources (WDNR), SEWRPC, and the City of New Berlin.

On September 13, 1984, a meeting was held with representatives of the Study Contractor, the City of New Berlin, the WDNR, and SEWRPC to determine study areas.

On September 23, 1985, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of New Berlin, Waukesha County, Wisconsin. The area of study is shown on the Vicinity Map (Figure 1).

Flooding caused by overflow of the following streams was studied in detail:

a. Root River, from South 124th Street to about 400 feet downstream of Sunny Slope Road;

b. West Branch Root River, from South 124th Street to Sunny Slope Road;

c. Calhoun Creek, from College Avenue to State Highway 15;

d. Dakota Street Tributary, from the mouth to about 0.3 mile upstream of mouth;

e. Deer Creek, from Greenfield Avenue to just east of the intersection of Fenway Drive and Regal Drive;

f. South 130th Street Tributary, from the mouth to about 500 feet downstream of South 130th Street;

g. Poplar Creek, from about 0.36 mile downstream of Arcadian Avenue to Coffee Road;

h. South Branch Underwood Creek, from just upstream of Meadow Lane to just downstream of Sunny Slope Road; and

i. Upper Kelly Lake Tributary, from the mouth to just west of Apple Blossom Lane.

Upper Kelly Lake was studied in detail within the corporate limits.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards.

The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through December 1989. The scope and methods of study were proposed to and agreed upon by FEMA and the City of New Berlin.

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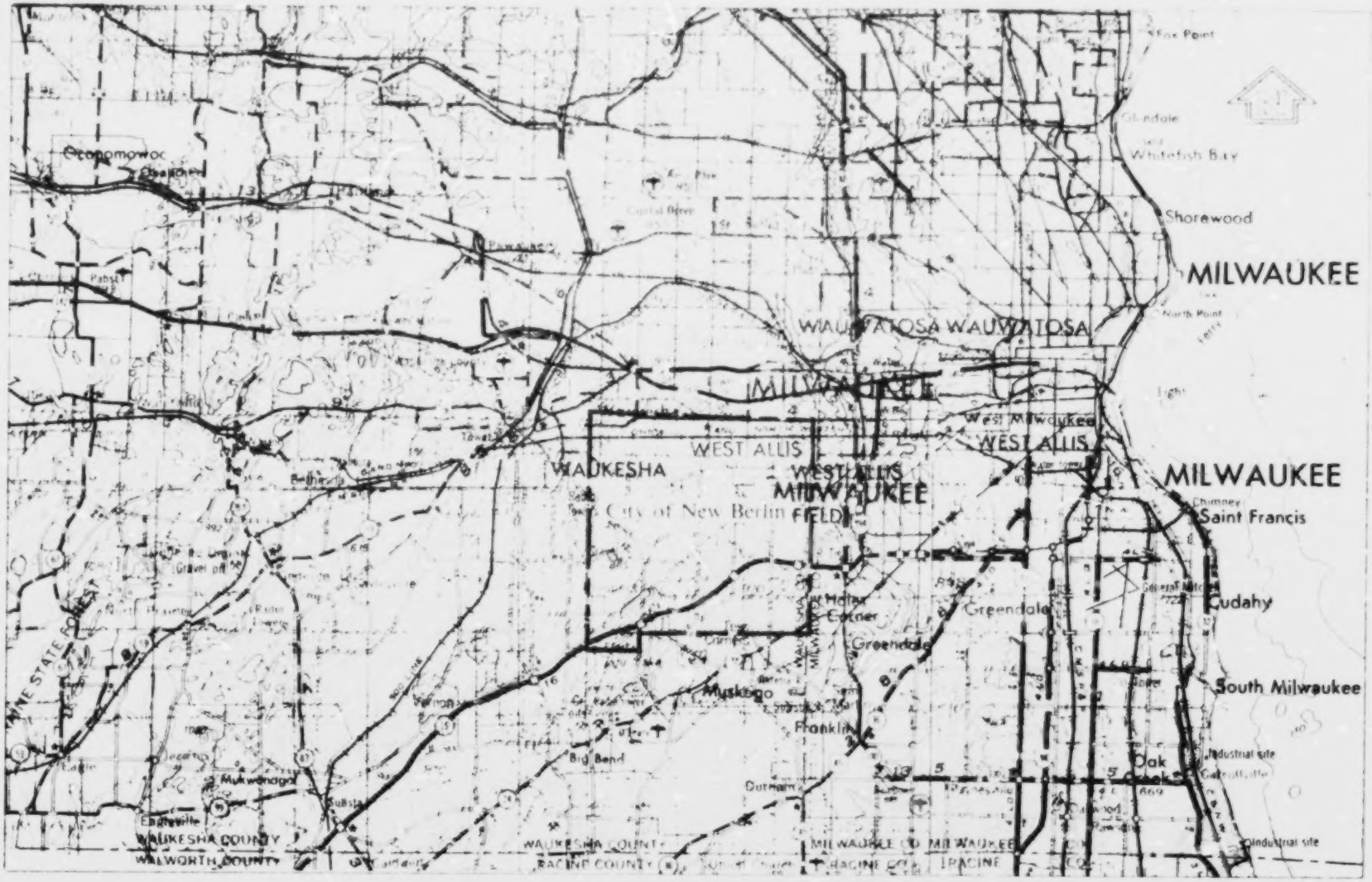

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

2.2 Community Description

The City of New Berlin is situated approximately 10 miles west of the City of Milwaukee, in east-central Waukesha County, in southeastern Wisconsin. It is bordered by the Town of Brookfield on the north, the Cities of West Allis, Greenfield, and Hales Corners on the east, the City of Muskego on the south, and the unincorporated areas of Waukesha County on the west. The 1980 population was reported to be 30,529 (Reference 2).

In 1836, Sidney Evans and P.G. Harrington and his wife were the first settlers in this area now known as the City of New Berlin. In 1838, this frontier site was included as a part of the Town of Muskego. An autumn land sale in 1839 attracted a large influx of immigrants. That same year, Muskego was divided into quarters. The northeast quarter of the Town of Muskego was given the name of New Berlin by the State Legislature on January 13, 1840 (Reference 3).

New Berlin has a gentle rolling topography of marshes, flat plains, and lakes throughout the area (Reference 1). Underlying a good portion of the city is Niagra limestone with an occasional outcropping. Silty clay loams and silty clays of the Ozaukee-Morley-Mequon Soil Association are predominant in the area (Reference 4).

The climate of this locale is classified as continental with four distinct seasons that are affected by Lake Michigan (Reference 5). Prevailing winds are from the southwest during the summer season and out of the northwest in the winter. The mean temperature varies from 21 degrees Fahrenheit (F.) for the month of January to about 72 degrees F. for the month of July. Mean annual rainfall is about 30 inches with over one-third falling during the summer season (Reference 6).

Approximately 73 percent of the city land area falls within the Fox River watershed. Poplar Creek, a tributary to the Fox River, drains the northwestern portion of New Berlin (Reference 1). Deer Creek, a stream that drains the northeastern portion of the city, is a tributary of Poplar Creek.

At this time, the major portion of the drainage channels in the city lies in undeveloped or partially developed residential lands. This could change as the expansion to New Berlin continues with increasing residential development. The flood plain development consists primarily of residential development with small commercial industries.

2.3 Principal Flood Problems

Flooding in the City of New Berlin is usually caused by high intensity rainfall with or without snowmelt.

The two recent major floods in the area occurred in July 1938 and March-April 1960. High intensity rainfall resulted in the 1938 flood, while a combination of snow cover with rapid thawing and rainfall caused the 1960 flood (Reference 1).

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2.4 Flood Protection Measures

There are no known flood protection structures in the City of New Berlin. In 1974, a stormwater drainage analysis of the various watersheds was completed (Reference 7). The city has implemented some of the channel modifications recommended by the study.

The New Berlin flood plain ordinance prohibits the construction of structures on lands designated as flood plains on the city zoning map (Reference 8). This Flood Insurance Study is expected to provide data that will be used to update the existing flood plain information for the city.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

The hydrologic analysis for Deer Creek was provided by SEWRPC. The SEWRPC discharges were developed using the U.S. Soil Conservation Service (SCS) TR-20 Hydrologic Computer Model (Reference 9). The principal function of this model is to compute a unit hydrograph for each basin, as well as excess rainfall for each of the different frequency storms. Rainfall excess was computed from accumulated rainfall using an SCS runoff equation that equates runoff as a function of soil type, antecedent moisture conditions, and land use. This model has the capability of analyzing individual segments of a riverine system. Therefore, it can take into account channel and overbank storage, as well as local peak discharges caused by individual tributaries. Due to this capability, local increases or decreases of peak discharges are possible. The resulting discharges were checked for validity and were deemed acceptable for this study.

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Discharges for Calhoun Creek were determined using the peak discharge-frequency analysis. The discharges for Poplar Creek are reported in the Fox River watershed study (Reference 1). This study used the SCS TR-20 computer program (Reference 9). These discharges are for the 1990 land-use conditions, but are found to be in close agreement with existing conditions.

The remaining streams studied by detailed methods within the City of New Berlin are of much smaller dimensions. Due to the facts that the drainage areas average only approximately 1 square mile and that they are highly urbanized, the methodology outlined in the SCS National Engineering Handbook (Reference 10) was deemed appropriate. Using this procedure, the time of concentration and the time of peak are computed for the basin, and a unit hydrograph is developed. The expected 6-hour rainfall for the desired frequency event was obtained from Technical Paper No. 40 (Reference 11), and distributed into 30-minute amounts as described in the SCS criteria for design storms. A 6-hour duration storm was chosen since it was determined to be the "effective duration" for areas having an average annual precipitation of approximately 30 inches. Rainfall excess is computed from accumulated rainfall, using an SCS runoff equation that equates runoff as a function of soil type, antecedent moisture condition, and land use. Utilizing these precipitation data and derived unit hydrograph, an outflow hydrograph is computed for the basin.

The discharges computed reflect the present land use within the basin. Future development, without regard to changes in the runoff characteristics of the basins, could substantially increase these flows.

Peak discharges for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 1.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

The cross sections used for the study were obtained by photogrammetric techniques and 2-foot contour maps (Reference 12).

All bridge elevation data and structural geometry for the backwater analyses of each flooding source studied were obtained by field surveys by the Study Contractor. The channel soundings were also obtained by field measurement.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Boundary and Floodway Map.

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TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA SQ MILES	PEAK DISCHARGES (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
ROOT RIVER					
just upstream of the western corporate limits	1.6	325	500	600	900
WEST BRANCH ROOT RIVER					
just upstream of the western county boundary	1.7	580	840	960	1,200
just upstream of South 128th Street	0.9	340	550	650	900
just upstream of Dakota Street	0.4	210	340	400	575
CALHOUN CREEK					
just upstream of College Avenue	8.1	1,150	1,760	2,060	2,900
about 200 feet upstream of Martin Road	3.8	570	870	1,000	1,360
just upstream of Beres Road	2.3	550	840	960	1,300
just upstream of Beloit Road (near Moorland Road)	1.0	240	360	420	570
DAKOTA STREET TRIBUTARY					
just upstream of the mouth	0.3	50	90	125	200
DEER CREEK					
just upstream of Greenfield Avenue	4.5	380	610	750	1,080
just upstream of the Chicago and North Western Railroad	N/A	360	600	700	1,020
just upstream of Cleveland Avenue	N/A	310	520	620	890
about 1,000 feet downstream of San Mateo Drive	N/A	220	380	450	660

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TABLE 1 - SUMMARY OF DISCHARGES (continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA SQ MILES	PEAK DISCHARGES (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
SOUTH 130TH STREET TRIBUTARY					
just upstream of the mouth	0.5	100	200	250	400
POPLAR CREEK					
just upstream of Lincoln Avenue	7.9	530	840	1,000	1,410
just upstream of Cleveland Avenue	4.6	400	620	730	1,000
just upstream of Coffee Road	3.2	290	450	540	740
SOUTH BRANCH UNDERWOOD CREEK					
just upstream of Meadow Lane	1.1	225	350	400	550
UPPER KELLY LAKE TRIBUTARY					
just upstream of Upper Kelly Lake	1.2	250	400	500	720
just downstream of West Balboa Drive	0.5	150	250	300	450

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Channel roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and based on field observations of the streams and flood plain areas. The Manning's "n" values are shown below.

Stream	Manning's "n" Values	
	Channel	Overbank
Calhoun Creek	0.017 - 0.05	0.05 - 0.09
Dakota Street Tributary	0.04	0.11
Deer Creek	0.035 - 0.05	0.06 - 0.1
Root River	0.04 - 0.045	0.07 - 0.1
South Branch Underwood Creek	0.045	0.07 - 0.12
South 130th Street Tributary	0.04	0.09
Upper Kelly Lake Tributary	0.035 - 0.05	0.06 - 0.1
West Branch Root River	0.035 - 0.04	0.06 - 0.11
Poplar Creek	0.04 - 0.045	0.04 - 0.12

The acceptability of all assumed hydraulic factors, cross sections, and hydraulic structure data was checked by computations that duplicated historic floodwater profiles whenever possible.

Water-surface elevations were computed using the COE HEC-2 step-backwater computer program (Reference 13).

The starting water-surface elevations for Deer Creek and Poplar Creek were obtained from the Flood Insurance Study for the City of Brookfield (Reference 14). Starting water-surface elevations for Calhoun Creek were obtained from the Flood Insurance Study for the City of Muskego (Reference 15). Starting water-surface elevations for the Root River and West Branch Root River were obtained from normal depth analysis, while flood stages at the confluence of West Branch Root River were used to determine starting water-surface elevations for Dakota Street Tributary and South 130th Street Tributary. Storm sewer computations were used to determine starting water-surface elevations for South Branch Underwood Creek. Finally, starting water-surface elevations for Upper Kelly Lake Tributary were obtained from lake elevations for Upper Kelly Lake.

Lake stages for Upper Kelly Lake were derived using the modified puls option of the COE computer program HEC-1 (Reference 16). The discharge rating curve was computed based on the hydraulic capacities of the dam and the downstream culvert near the outflow. Storage was estimated using the 2-foot contour maps (Reference 12).

The summary of elevations for Upper Kelly Lake is shown in Table 2.

TABLE 2 - SUMMARY OF ELEVATIONS

FLOODING SOURCE AND LOCATION	PEAK ELEVATIONS (FEET NGVD)			
	10-YEAR	50-YEAR	100-YEAR	500-YEAR
UPPER KELLY LAKE				
along entire shoreline	807.5	808.1	808.4	810.0

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Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 50- and 100-year flood elevations are close together, due to limitations of the profile scale, only the 100 year profile has been drawn.

The hydraulic analyses for this study are based only on the effects of unobstructed flow. The flood elevations shown on the profiles are, thus, considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing flood plain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year flood plain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at scales of 1:4800 and 1:2400 with a contour interval of 2 feet (References 12 and 17).

For the streams studied by approximate methods, only the 100-year flood plain boundary was delineated using topographic maps at a scale of 1:4800 with a contour interval of 2 feet (Reference 18).

The 100- and 500-year flood plain boundaries are shown on the Flood Boundary and Floodway Map. In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on flood plains, such as structures and fill, reduces the flood-carrying capacity, increases the flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood plain is divided into a floodway and

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a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. However, the WDNR has established a policy that limits encroachment in the flood plain to 0.1 foot (Reference 19).

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed and are presented in Table 3, Floodway Data.

As shown on the Flood Boundary and Floodway Map, the floodway boundaries were computed at cross sections. Between cross sections, the boundaries were interpolated. In cases where the floodway and the 100-year flood plain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and the 100-year flood plain boundaries is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 0.1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

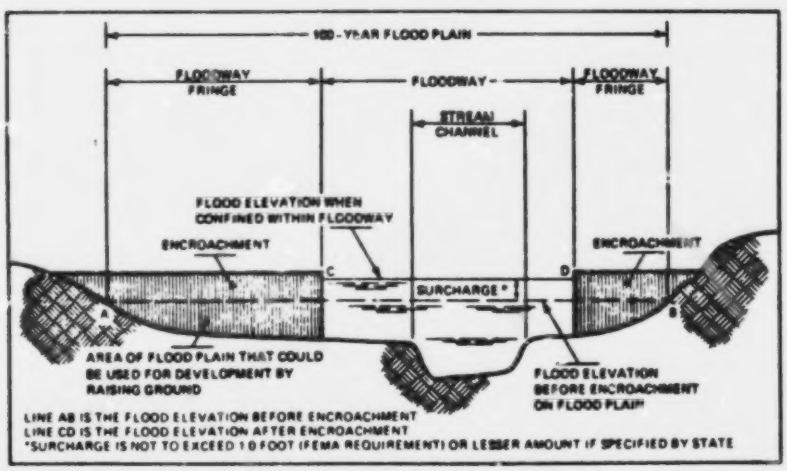
100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE *
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FIGURE 2 - Floodway Schematic

The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATEP SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
DEER CREEK								
AA	33,647	20	132	3.4	868.6	868.6	868.6	0.0
AB	34,153	43	192	2.3	868.8	868.8	868.8	0.0
AC	35,103	47	207	2.2	869.7	869.7	869.7	0.0
AD	35,593	73	241	1.9	870.1	870.1	870.1	0.0
AE	36,203	170	415	1.1	870.4	870.4	870.4	0.0
AF	36,643	200	558	0.8	870.5	870.5	870.5	0.0
AG	37,053	134	437	1.0	870.6	870.6	870.6	0.0
AH	37,653	120	234	1.3	870.8	870.8	870.8	0.0
AI	38,148	70	248	1.2	871.0	871.0	871.0	0.0
AJ	39,003	88	158	1.4	871.6	871.6	871.6	0.0
AK	39,773	35	86	2.6	873.0	873.0	873.0	0.0
SOUTH 130TH STREET TRIBUTARY								
A	100	170	369	0.7	764.5	764.5	764.5	0.0
B	335	85	115	2.2	765.2	765.2	765.2	0.0
C	447	55	129	1.9	766.4	766.4	766.4	0.0
D	737	110	126	2.0	767.8	767.8	767.8	0.0
E	917	97	103	2.4	771.3	771.3	771.3	0.0
F	1247	69	113	2.2	773.9	773.9	773.9	0.0
G	1477	30	50	5.0	776.3	776.3	776.3	0.0
H	1677	95	118	2.1	778.3	778.3	778.3	0.0
I	2021	73	86	2.9	782.7	782.7	782.7	0.0

[1]FEET ABOVE MOUTH

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

FLOODWAY DATA

DEER CREEK—SOUTH 130TH STREET TRIBUTARY

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
DEER CREEK								
A	18,179	119	245	3.1	842.5	842.5	842.5	0.0
B	18,979	340	1958	0.4	842.9	842.9	842.9	0.0
C	19,649	340	1903	0.4	843.0	843.0	843.0	0.0
D	20,159	240	1523	0.5	843.0	843.0	843.0	0.0
E	20,529	310	1318	0.5	843.0	843.0	843.0	0.0
F	21,054	44	523	1.3	844.5	844.5	844.5	0.0
G	21,464	198	660	1.1	844.5	844.5	844.5	0.0
H	21,852	272	570	1.2	844.5	844.5	844.5	0.0
I	22,537	151	559	1.3	844.7	844.7	844.7	0.0
J	23,287	111	431	1.6	845.0	845.0	845.0	0.0
K	23,694	96	161	4.2	845.4	845.4	845.4	0.0
L	24,269	75	302	2.2	846.0	846.0	846.0	0.0
M	25,269	105	343	2.0	846.9	846.9	846.9	0.0
N	25,718	23	109	6.1	848.0	848.0	848.0	0.0
O	26,418	35	90	7.4	852.0	852.0	852.0	0.0
P	27,054	92	349	1.8	855.7	855.7	855.7	0.0
Q	28,214	70	242	2.6	856.5	856.5	856.5	0.0
R	28,926	33	185	3.0	857.4	857.4	857.4	0.0
S	29,649	21	96	5.8	858.5	858.5	858.5	0.0
T	30,539	360	679	0.8	861.3	861.3	861.3	0.0
U	31,239	195	209	2.7	862.5	862.5	862.5	0.0
V	31,653	25	106	4.8	864.3	864.3	864.3	0.0
W	32,059	101	211	2.4	866.1	866.1	866.1	0.0
X	32,479	31	113	4.5	867.2	867.2	867.2	0.0
Y	32,929	58	242	2.1	868.0	868.0	868.0	0.0
Z	33,209	64	263	1.7	868.2	868.2	868.2	0.0

[1]FEET ABOVE MOUTH

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

FLOODWAY DATA

DEER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
CALHOUN CREEK								
AA	4.045	470	960	0.9	846.9	846.9	846.9	0.0
AB	4.504	210	140	2.9	854.5	854.5	854.5	0.0
AC	4.674	70	130	3.2	863.6	863.6	863.6	0.0
AD	4.703	100	500	0.8	866.7	866.7	866.7	0.0
AE	4.724	230	770	0.5	866.7	866.7	866.7	0.0
AF	4.835	290	470	0.9	866.8	866.8	866.8	0.0
AG	4.956	10	80	5.1	870.3	870.3	870.3	0.0
DAKOTA STREET TRIBUTARY								
A	100[2]	51	92	1.4	785.8	785.8	785.8	0.0
B	230[2]	30	53	2.4	786.1	786.1	786.1	0.0
C	490[2]	42	41	3.0	789.7	789.7	789.7	0.0
D	720[2]	65	66	1.9	792.8	792.8	792.8	0.0
E	870[2]	41	35	3.6	796.1	796.1	796.1	0.0
F	1210[2]	65	57	2.2	801.6	801.6	801.6	0.0
G	1510[2]	65	56	2.2	805.0	805.0	805.0	0.0

[1]MILES ABOVE MOUTH
[2]FEET ABOVE MOUTH

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

FLOODWAY DATA

CALHOUN CREEK—DAKOTA STREET TRIBUTARY

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
CALHOUN CREEK								
A	0.673	15	210	9.6	815.6	815.6	815.6	0.0
B	0.692	210	1480	1.4	821.0	821.0	821.0	0.0
C	0.717	330	2860	0.7	821.0	821.0	821.0	0.0
D	0.776	345	2700	0.8	821.0	821.0	821.0	0.0
E	0.906	290	1620	1.3	821.1	821.1	821.1	0.0
F	1.162	570	1780	0.7	821.2	821.2	821.2	0.0
G	1.385	110	450	2.8	821.4	821.4	821.4	0.0
H	1.415	50	260	4.8	821.4	821.4	821.4	0.0
I	1.438	140	520	2.4	821.9	821.9	821.9	0.0
J	1.576	310	850	1.2	822.6	822.6	822.6	0.0
K	1.919	560	1480	0.7	823.2	823.2	823.2	0.0
L	2.199	25	170	5.9	824.1	824.1	824.1	0.0
M	2.273	300	560	1.8	825.5	825.5	825.5	0.0
N	2.607	410	620	1.6	827.8	827.8	827.8	0.0
O	2.782	220	510	2.0	828.9	828.9	828.9	0.0
P	2.802	195	640	1.6	830.7	830.7	830.7	0.0
Q	2.816	285	830	1.2	830.7	830.7	830.7	0.0
R	2.962	260	450	2.1	831.2	831.2	831.2	0.0
S	3.099	215	250	3.2	833.4	833.4	833.4	0.0
T	3.125	260	1080	0.8	835.0	835.0	835.0	0.0
U	3.158	190	490	1.7	836.4	836.4	836.4	0.0
V	3.275	200	440	1.9	836.9	836.9	836.9	0.0
W	3.405	195	350	2.3	838.2	838.2	838.2	0.0
X	3.658	125	250	3.3	843.1	843.1	843.1	0.0
Y	3.708	130	500	1.6	845.8	845.8	845.8	0.0
Z	3.758	270	540	1.5	845.9	845.9	845.9	0.0

[1]MILES ABOVE MOUTH

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

FLOODWAY DATA

CALHOUN CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
WEST BRANCH ROOT RIVER								
A	4389	70	271	3.5	751.2	751.2	751.2	0.0
B	4669	81	178	5.4	752.9	752.9	752.9	0.0
C	4669	121	390	2.5	755.0	755.0	755.0	0.0
D	5277	140	695	1.4	757.7	757.7	757.7	0.0
E	5542	187	491	2.0	757.9	757.9	757.9	0.0
F	5882	137	237	4.1	759.6	759.6	759.6	0.0
G	6333	15	130	7.4	763.1	763.1	763.1	0.0
H	6745	100	313	2.1	766.2	766.2	766.2	0.0
I	6955	139	363	1.8	767.8	767.8	767.8	0.0
J	7268	77	272	2.4	772.4	772.4	772.4	0.0
K	7598	168	409	1.6	772.9	772.9	772.9	0.0
L	7998	28	83	6.5	778.3	778.3	778.3	0.0
M	8267	135	292	1.8	781.8	781.8	781.8	0.0
N	8437	215	605	0.9	782.3	782.3	782.3	0.0
O	8938	22	52	7.7	785.7	785.7	785.7	0.0
P	9198	60	104	3.8	789.5	789.5	789.5	0.0
Q	9518	87	121	3.3	793.9	793.9	793.9	0.0
R	10,124	20	59	6.8	805.7	805.7	805.7	0.0
S	10,594	24	65	6.2	810.5	810.5	810.5	0.0
T	10,934	89	158	2.5	815.1	815.1	815.1	0.0
U	11,454	33	69	4.7	821.5	821.5	821.5	0.0
V	11,675	7	41	7.9	826.9	826.9	826.9	0.0

[1]FEET ABOVE MOUTH

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

FLOODWAY DATA

WEST BRANCH ROOT RIVER

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
ROOT RIVER								
A	223,789	267	324	1.9	761.1	761.1	761.1	0.0
B	224,299	240	305	2.0	763.3	763.3	763.3	0.0
C	225,209	302	233	2.6	768.1	768.1	768.1	0.0
D	226,039	172	216	2.8	773.3	773.3	773.3	0.0
E	226,739	314	310	1.7	778.3	778.3	778.3	0.0
F	226,909	173	191	2.7	779.9	779.9	779.9	0.0
G	227,459	80	161	3.3	784.3	784.3	784.3	0.0
H	227,959	193	249	2.1	788.9	788.9	788.9	0.0
I	228,529	93	153	3.4	793.4	793.4	793.4	0.0
J	228,664	190	373	1.4	795.2	795.2	795.2	0.0
K	229,094	78	165	3.2	797.0	797.0	797.0	0.0
L	229,574	155	185	2.8	803.3	803.3	803.3	0.0
M	229,934	90	180	2.5	807.9	807.9	807.9	0.0
N	230,574	51	50	3.6	821.0	821.0	821.0	0.0

[1]FEET ABOVE MOUTH

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

FLOODWAY DATA

ROOT RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
POPLAR CREEK								
A	3.251	720	3740	0.2	830.4	830.4	830.4	0.0
B	3.509	30	230	3.8	830.5	830.5	830.5	0.0
C	3.667	400	2610	0.3	830.9	830.9	830.9	0.0
D	3.810	15	170	5.2	830.9	830.9	830.9	0.0
E	3.827	65	440	2.0	831.5	831.5	831.5	0.0
F	3.852	245	1680	0.5	831.6	831.6	831.6	0.0
G	4.184	40	310	2.8	832.0	832.0	832.0	0.0
H	4.357	950	4270	0.2	832.2	832.2	832.2	0.0
I	4.651	1220	5770	0.2	832.3	832.3	832.3	0.0
J	4.931	1205	5060	0.2	832.3	832.3	832.3	0.0
K	5.215	990	4610	0.2	832.3	832.3	832.3	0.0
L	5.566	550	1980	0.5	833.2	833.2	833.2	0.0
M	5.789	625	360	2.8	833.2	833.2	833.2	0.0
N	5.991	670	1160	0.9	835.4	835.4	835.4	0.0
O	6.294	380	360	2.8	836.8	836.8	836.8	0.0
P	6.442	335	510	2.0	840.5	840.5	840.5	0.0
Q	7.080	195	370	2.7	849.7	849.7	849.7	0.0
R	7.169	10	170	4.4	859.7	859.7	859.7	0.0
S	7.203	200	1730	0.4	859.8	859.8	859.8	0.0
T	7.416	200	800	0.9	859.8	859.8	859.8	0.0
U	7.771	145	650	1.1	863.8	863.8	863.8	0.0
V	7.870	435	850	0.9	864.0	864.0	864.0	0.0
W	8.020	174	306	2.4	864.8	864.8	864.8	0.0
X	8.340	520	560	1.3	867.2	867.2	867.2	0.0

[1]MILES ABOVE MOUTH

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TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

FLOODWAY DATA

POPLAR CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
SOUTH BRANCH UNDERWOOD CREEK								
A	6200	19	53	6.3	761.3	761.3	761.3	0.0
B	6670	107	122	3.3	768.4	768.4	768.4	0.0
C	7110	131	205	2.0	771.5	771.5	771.5	0.0
D	7470	59	78	5.1	774.3	774.3	774.3	0.0
E	7730	92	238	1.7	776.3	776.3	776.3	0.0
F	7890	80	62	6.5	780.2	780.2	780.2	0.0
G	8032	115	295	1.4	782.6	782.6	782.6	0.0
H	8432	116	122	2.9	787.2	787.2	787.2	0.0
I	8744	121	300	1.2	795.8	795.8	795.8	0.0
J	9074	74	99	3.5	798.8	798.8	798.8	0.0
K	9394	82	140	2.5	802.5	802.5	802.5	0.0
L	9634	94	101	3.5	805.1	805.1	805.1	0.0
M	9964	20	51	6.9	809.4	809.4	809.4	0.0
N	10,368	22	90	3.3	815.9	815.9	815.9	0.0
O	10,578	22	50	6.0	817.3	817.3	817.3	0.0
P	10,778	69	198	1.5	819.0	819.0	819.0	0.0
Q	10,913	41	68	4.4	819.9	819.9	819.9	0.0
R	11,143	37	59	5.1	825.5	825.5	825.5	0.0

[1]FEET ABOVE MOUTH

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

FLOODWAY DATA

SOUTH BRANCH UNDERWOOD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
UPPER KELLY LAKE TRIBUTARY								
A	150	212	136	3.7	809.2	808.6[2]	808.6	0.0
B	451	93	197	2.5	810.0	810.0	810.0	0.0
C	781	69	102	4.9	811.6	811.6	811.6	0.0
D	1011	87	119	4.2	814.6	814.6	814.6	0.0
E	1589	69	346	1.4	819.1	819.1	819.1	0.0
F	2009	35	82	6.1	819.9	819.9	819.9	0.0
G	2479	63	159	2.8	824.8	824.8	824.8	0.0
H	2779	72	127	3.5	826.3	826.3	826.3	0.0
I	3079	56	94	4.8	829.3	829.3	829.3	0.0
J	3509	60	136	3.3	834.4	834.4	834.4	0.0
K	3750	53	168	2.7	836.8	836.8	836.8	0.0
L	4210	55	121	2.5	843.2	843.2	843.2	0.0
M	4413	42	146	2.1	843.6	843.6	843.6	0.0
N	4648	46	76	3.9	844.0	844.0	844.0	0.0
O	4876	25	64	4.7	844.9	844.9	844.9	0.0
P	5306	100	213	1.4	848.0	848.0	848.0	0.0
Q	5775	12	41	7.3	849.4	849.4	849.4	0.0
R	6095	69	99	3.0	851.9	851.9	851.9	0.0
S	6405	96	90	2.9	853.6	853.6	853.6	0.0
T	6745	27	66	3.9	854.9	854.9	854.9	0.0

[1]FEET ABOVE MOUTH
[2]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM UPPER KELLY LAKE

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TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

FLOODWAY DATA

UPPER KELLY LAKE TRIBUTARY

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5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail affecting the City of New Berlin.

5.1 Reach Determinations

Reaches are defined as sections of flood plain that have relatively the same flood hazard, based on the weighted average difference in water-surface elevations between the 10- and 100-year floods. This difference may not have a variation greater than that indicated in the following table for more than 20 percent of the reach:

Average Difference Between 10- and 100-year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the riverine flooding sources of the City of New Berlin are shown on the Flood Profiles and are summarized in Table 4, Flood Insurance Zone Data.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for a riverine reach is the weighted average difference between the 10- and 100-year flood water-surface elevations rounded to the nearest 0.5 foot, multiplied by 10, and shown as a 3-digit code. For example, if the difference between elevations is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

Zone A: Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations are shown or FHFs determined.

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Zone A0:	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; depths are shown, but no FHFs are determined.
Zone AH:	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; base flood elevations are shown, but no FHFs are determined.
Zones A1-A3, A5, A7, A8:	Special Flood Hazard Areas inundated by the 100-year flood, with base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- and 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and, areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding; not subdivided.

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community are shown in Table 4, Flood Insurance Zone Data.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of New Berlin is, for insurance purposes, the principal product of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines for riverine flooding sources show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
ROOT RIVER							
REACH 1	0002,0004	−0.6	−0.2	0.3	005	A1	VARIES—SEE MAP
WEST BRANCH ROOT RIVER							
REACH 1	0004	−1.3	−0.4	0.7	015	A3	VARIES—SEE MAP
CALHOUN CREEK							
REACH 1	0005,0006,0007	−0.9	−0.3	1.4	010	A2	VARIES—SEE MAP
DAKOTA STREET TRIBUTARY							
REACH 1	0004	−0.7	−0.3	0.4	005	A1	VARIES—SEE MAP
DEER CREEK							
REACH 1	0002,0004	−3.3	−1.4	1.7	035	A7	VARIES—SEE MAP
REACH 2	0004,0006	−1.7	−0.6	1.7	015	A3	VARIES—SEE MAP
SOUTH 130TH STREET TRIBUTARY							
REACH 1	0004	−1.3	−0.3	0.7	015	A3	VARIES—SEE MAP

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

FLOOD INSURANCE ZONE DATA

ROOT RIVER—WEST BRANCH ROOT RIVER—CALHOUN CREEK—DAKOTA STREET TRIBUTARY—DEER CREEK—SOUTH 130TH STREET TRIBUTARY

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
POPLAR CREEK							
REACH 1	0001,0003	−2.6	−0.7	1.6	025	A5	VARIES—SEE MAP
REACH 2	0003	−1.1	−0.3	0.7	010	A2	VARIES—SEE MAP
REACH 3	0003	−4.0	−1.9	8.0	040	A8	VARIES—SEE MAP
REACH 4	0003,0004	−1.0	−0.4	2.7	010	A2	VARIES—SEE MAP
SOUTH BRANCH UNDERWOOD CREEK							
REACH 1	0002	−0.8	−0.2	0.5	010	A2	VARIES—SEE MAP
UPPER KELLY LAKE TRIBUTARY							
REACH 1	0006	−1.2	−0.4	0.7	010	A2	VARIES—SEE MAP
UPPER KELLY LAKE							
REACH 1	0006	−0.9	−0.3	1.6	010	A2	809

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

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TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

FLOOD INSURANCE ZONE DATA

POPLAR CREEK—SOUTH BRANCH UNDERWOOD CREEK—
UPPER KELLY LAKE TRIBUTARY—UPPER KELLY LAKE

6.0 OTHER STUDIES

"A Comprehensive Plan for the Fox River Watershed" contains information on Poplar Creek and Deer Creek (Reference 1). The profiles in that plan do not agree with this Flood Insurance Study due to different land-use conditions, hydraulic structures, and utilization of different hydraulic techniques.

A Flood Insurance Study is in progress for the City of Brookfield (Reference 14). Flood Insurance Studies have been prepared for the City of Muskego, Unincorporated Areas of Waukesha County, and the Cities of West Allis and Greenfield (References 15, 20-22). The results of these studies agree with the Flood Insurance Study for the City of New Berlin.

A Flood Insurance Study has also been prepared for the Village of Hales Corner (Reference 23). This study does not agree with the City of New Berlin study, which uses more up-to-date analyses.

Due to its more detailed analysis, this Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for the City of New Berlin (Reference 24).

7.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 300 South Wacker Drive, Chicago, Illinois 60606.

8.0 REFERENCES AND BIBLIOGRAPHY

1. Southeastern Wisconsin Regional Planning Commission, Planning Report No. 12, A Comprehensive Plan for the Fox River Watershed, Volumes I and II, Waukesha County, Wisconsin, February 1970.

2. U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Wisconsin, Washington, D.C., February 1982.

3. New Berlin Public Library, New Berlin, Wisconsin, Untitled Literature about the History of New Berlin, received through Personal Communication, 1976.

4. U.S. Department of Agriculture, Soil Conservation Service, Soil Survey, Milwaukee and Waukesha Counties, Wisconsin, July 1971.

5. Wisconsin Conservation Department, Surface Water Resources of Waukesha County, R.J. Poff and C.W. Threinen, Madison, Wisconsin, 1963.

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7. City of New Berlin, Storm Water Sewerage Master Plan, J.C. Zimmerman Engineering Corporation.

8. ---------, Official Zoning Map, New Berlin, Wisconsin, March 1975.

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9. U.S. Department of Agriculture, Soil Conservation Service, Engineering Division, Technical Release No. 20, Computer Program for Project Formulation Hydrology, May 1965.

10. ————, Soil Conservation Service, National Engineering Handbook, Section 4, "Hydrology," August 1972.

11. U.S. Department of Commerce, Weather Bureau, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, Washington, D.C., January 1963.

12. Aero-Metric Engineering, Inc., Topographic Maps, City of New Berlin, Scale 1:4800, Contour Interval 2 feet: Sheboygan, Wisconsin, May 1983.

13. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water-Surface Profiles Generalized Computer Program, Davis, California, November 1976.

14. Federal Emergency Management Agency, Flood Insurance Study, City of Brookfield, Waukesha County, Wisconsin, in progress.

15. ————, Flood Insurance Study, City of Muskego, Waukesha County, Wisconsin, December 1982.

16. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-1-Flood Hydrograph Package, Computer Program 823-X6-L2610, Davis, California, January 1973.

17. City of New Berlin, Wisconsin, Topographic Maps, Scale 1:2400, Contour Interval 2 feet, 1974.

18. J.C. Zimmerman Engineering Corporation, Storm Water Drainage Master Plan Topographic Maps, City of New Berlin, Wisconsin, Scale 1:4800, Contour Interval 2 feet: Greenfield, Wisconsin, 1973.

19. Wisconsin Department of Natural Resources, Wisconsin's Flood Plain Management Program, Chapter NR 116, Register No. 259, 1977.

20. Federal Emergency Management Agency, Flood Insurance Study, Waukesha County, Unincorporated Areas, Wisconsin, August 1983.

21. ————, Federal Insurance Administration, Flood Insurance Study, City of West Allis, Milwaukee County, Wisconsin, April 1981.

22. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Greenfield, Milwaukee County, Wisconsin, June 1978.

23. ————, Federal Insurance Administration, Flood Insurance Study, Village of Hales Corner, Milwaukee County, Wisconsin, June 1979.

24. ————, Federal Insurance Administration, Flood Hazard Boundary Map, City of New Berlin, Waukesha County, Wisconsin, December 1975.

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9.0 REVISIONS DESCRIPTION

This section has been added to provide information regarding significant revisions made since the original Flood Insurance Study was printed. Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood hazard data located at the City of New Berlin Planning Department, 3805 South Casper Drive, New Berlin, Wisconsin.

9.1 First Revision (Revised July 4, 1988)

a. Acknowledgments

The hydraulic analyses for the revision to Poplar Creek were performed by the Federal Emergency Management Agency (FEMA) based on information submitted by the City of New Berlin. The hydraulic analyses for the revision to Upper Kelly Lake and Upper Kelly Lake Tributary were obtained from the Southeastern Wisconsin Regional Planning Commission (SEWRPC), Community Assistance Planning Report No. 121, "A Stormwater Management Plan for the Village of Hales Corners, Milwaukee County, Wisconsin" (Reference 25). FEMA reviewed and accepted these data for purposes of this revision.

b. Scope

The Poplar Creek channel location was revised between the downstream and upstream crossings of Calhoun Road. Detailed flooding information was revised along Poplar Creek from just downstream of the downstream crossing of Calhoun Road to Coffee Road. The elevations on Upper Kelly Lake and the downstream reach of Upper Kelly Lake Tributary were also revised.

c. Hydrologic and Hydraulic Analyses

The hydraulic analyses for Poplar Creek were revised to reflect the channel relocation between the upstream and downstream crossings of Calhoun Road. The revised water-surface profiles for Poplar Creek for the 10 -, 50 -, 100 -, and 500-year floods were computed using the U.S. Army Corps of Engineers HEC-2 step-backwater computer program (Reference 26). The City of New Berlin provided mapping indicating the correct alignment for Poplar Creek, field surveyed cross-sectional information, and photographs of the area taken on February 6, 1987. These data were used to modify the HEC-2 hydraulic computer model for Poplar Creek. The model was revised to include cross sections and correct cross sections that were inconsistent with the relocated channel. The Manning's roughness coefficients ("n" values) were revised to reflect the conditions shown in the photographs of the area. Peak discharges for Poplar Creek were still considered valid from the initial analysis and were not changed for this reanalysis.

The 100-year flood elevation for Upper Kelly Lake was revised using the HEC-2 step-backwater computer program (Reference 26). The 10-year flood elevation for Upper Kelly Lake was approximated based on the computed 100-year flood elevation and the previous hydraulic analysis. The 500-year flood elevation for Upper Kelly Lake was revised to match the Flood Insurance Study for the Village of Hales Corners, Wisconsin (Reference 27). The 50-year flood elevation for Upper Kelly Lake was considered valid from the initial analysis and was not changed for this revision. Flood elevations on Upper Kelly Lake without wave or runup heights are shown in Table 5, Revised Summary of Elevations. The 50-year flood elevation is repeated in Table 5 for reference. The 10 -, 100 -, and 500-year water-surface profiles for Upper Kelly Lake Tributary were revised to reflect the appropriate backwater effects from Upper Kelly Lake.

TABLE 5 - SUMMARY OF ELEVATIONS

FLOODING SOURCE AND LOCATION	PEAK ELEVATION (FEET NGVD)			
	10-YEAR	50-YEAR	100-YEAR	500-YEAR
UPPER KELLY LAKE along entire shoreline	807.4	808.1	809.2	811.9

d. Floodways

Floodway computations for Poplar Creek were revised as a result of the hydraulic analysis. The floodways were computed on the basis of equal conveyance reduction from each side of the floodplain. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was revised and are presented in Table 3, Floodway Data.

e. Other Studies

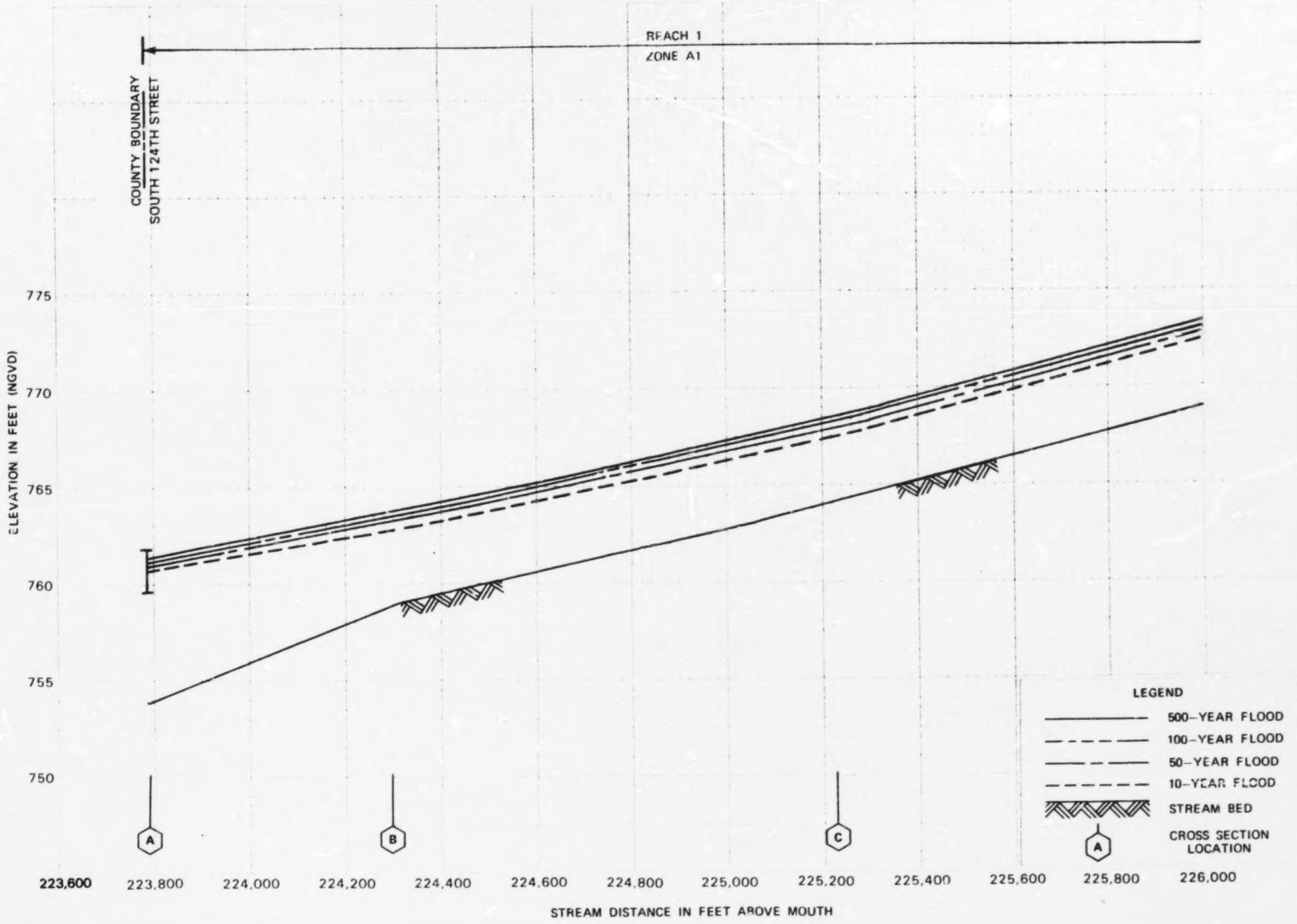
A Flood Insurance Study revision is in progress for the Village of Hales Corners, Wisconsin (Reference 27) and is in agreement with this study.

f. References and Bibliography

25. Southeastern Wisconsin Regional Planning Commission, Community Assistance Planning Report No. 121, A Stormwater Management Plan for the Village of Hales Corners, Milwaukee County, Wisconsin, March 1986.

26. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, April 1984.

27. Federal Emergency Management Agency, Flood Insurance Study, Village of Hales Corners, Milwaukee County, Wisconsin, June 1979, revision in progress.



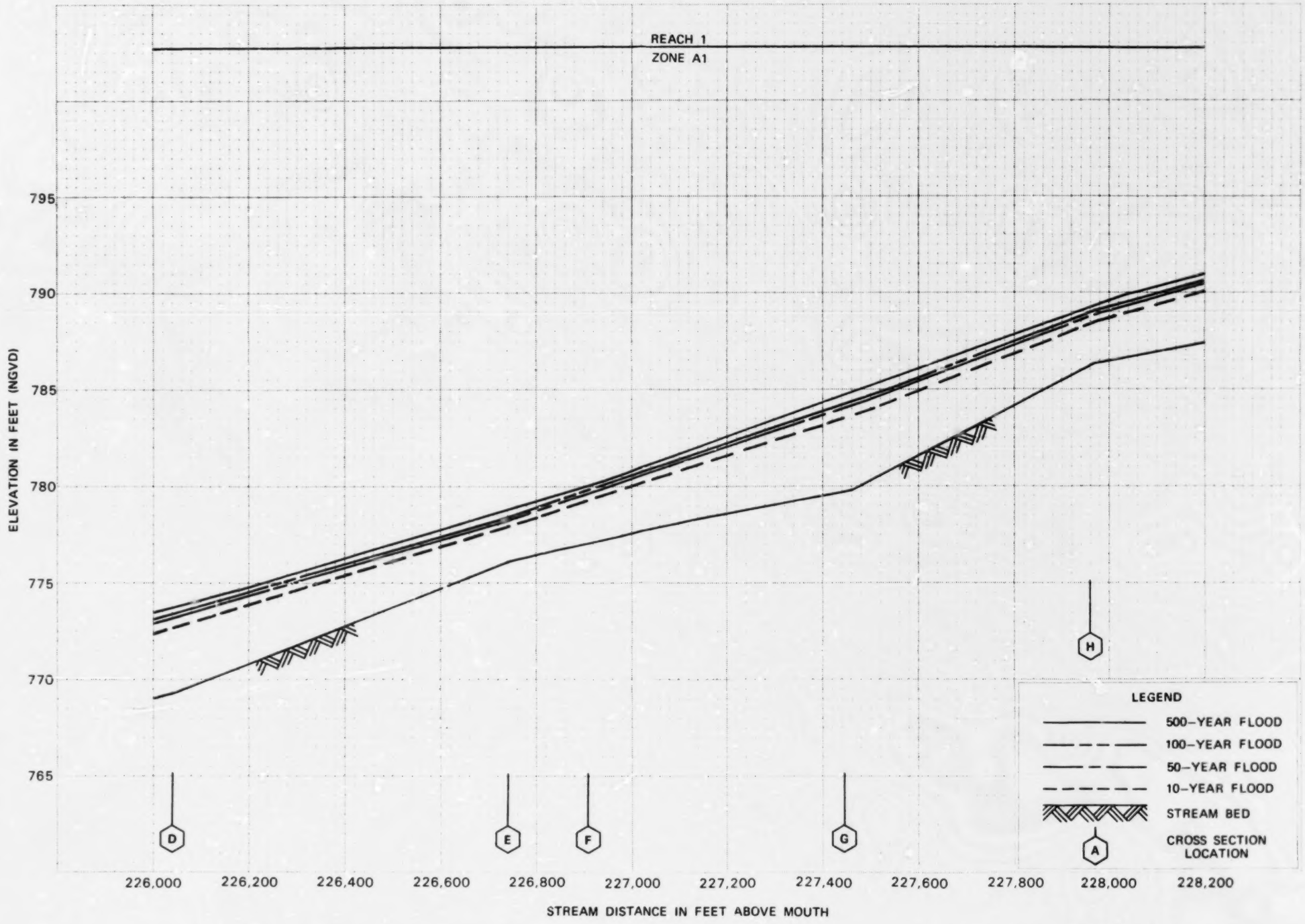
FLOOD PROFILES

ROOT RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI
(WAUKESHA CO.)

01P



FLOOD PROFILES

ROOT RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI
(WAUKESHA CO.)

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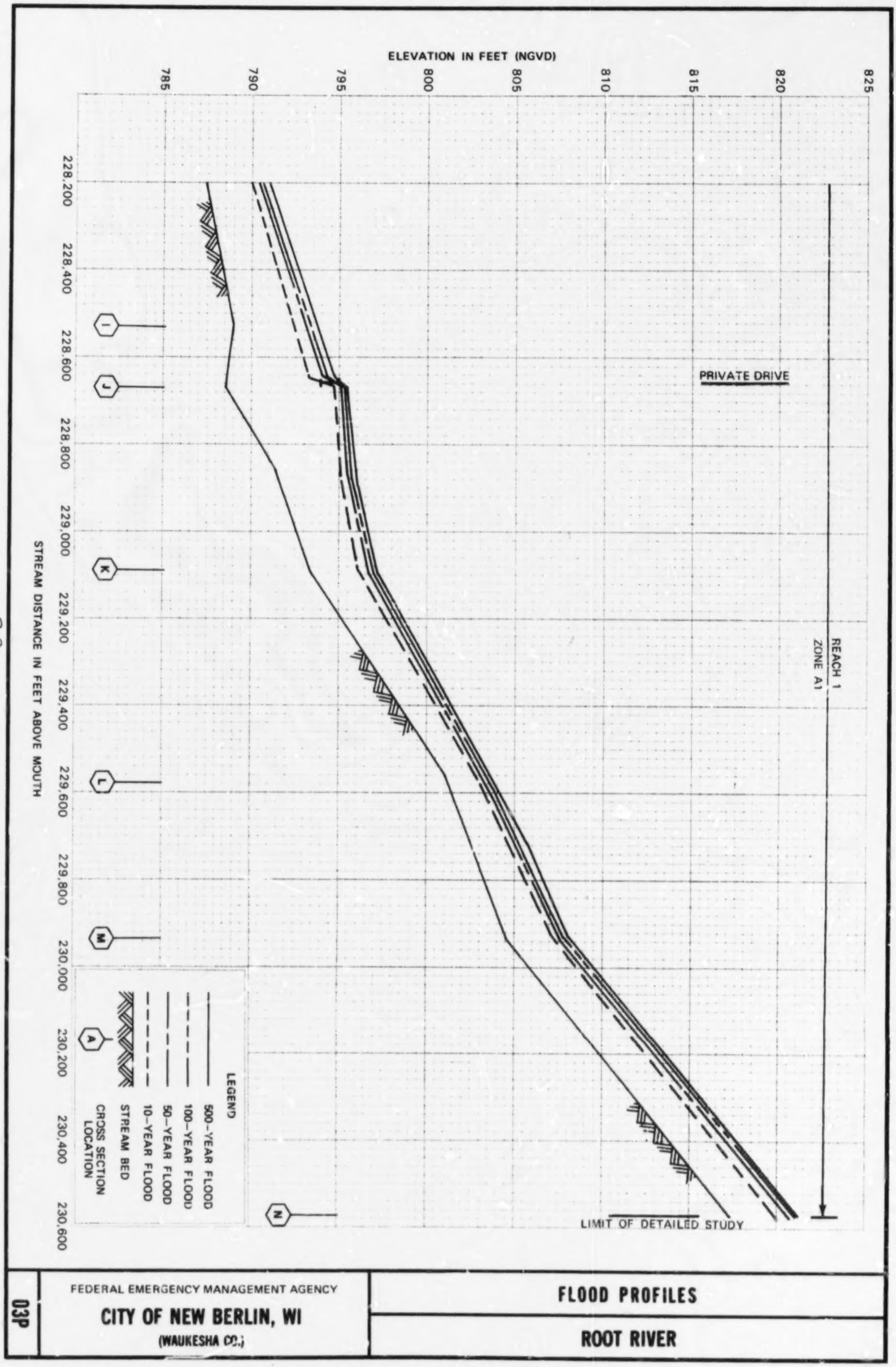

03P	FEDERAL EMERGENCY MANAGEMENT AGENCY **CITY OF NEW BERLIN, WI** (WAUKESHA CO.)	**FLOOD PROFILES** **ROOT RIVER**

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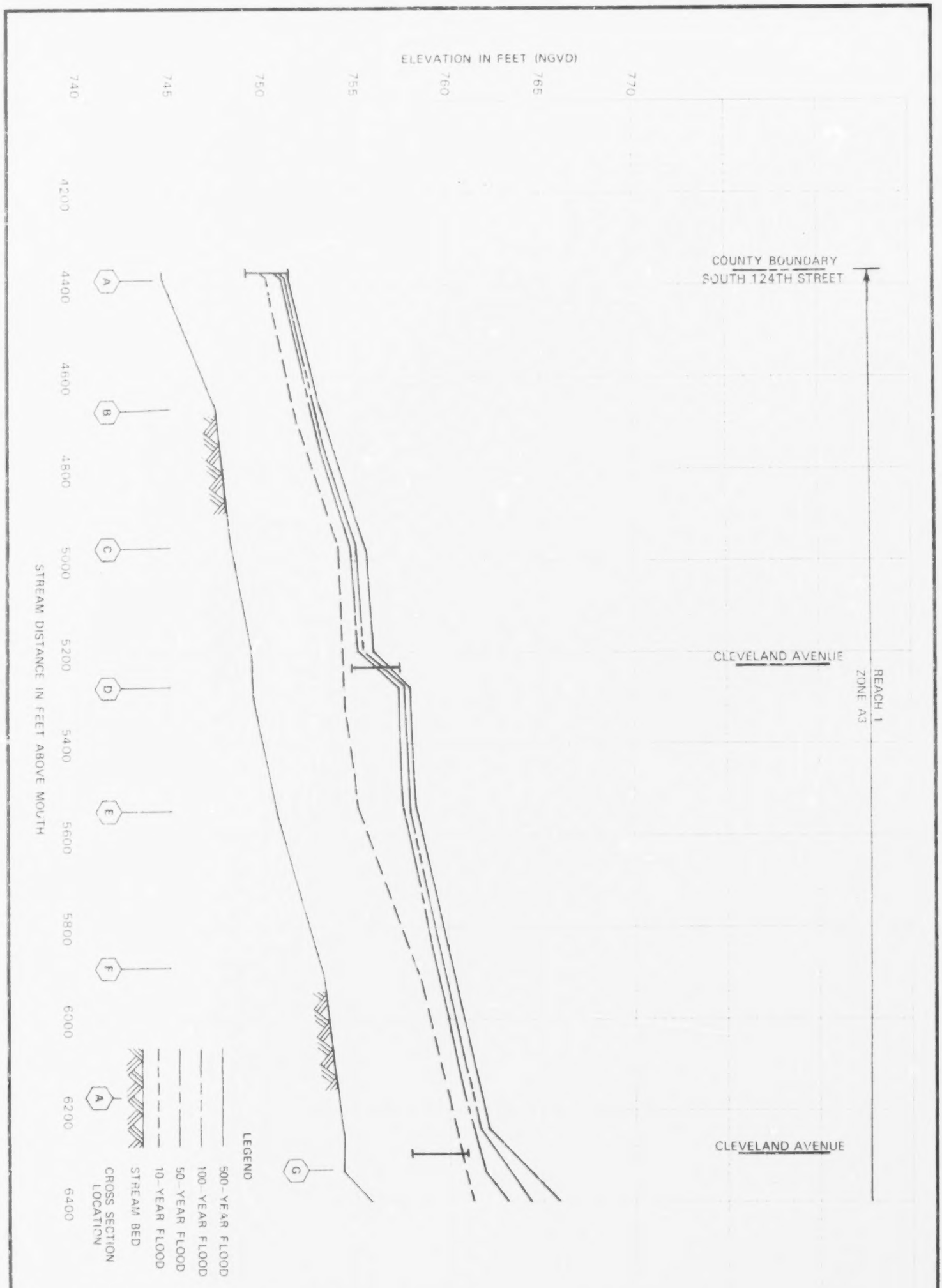
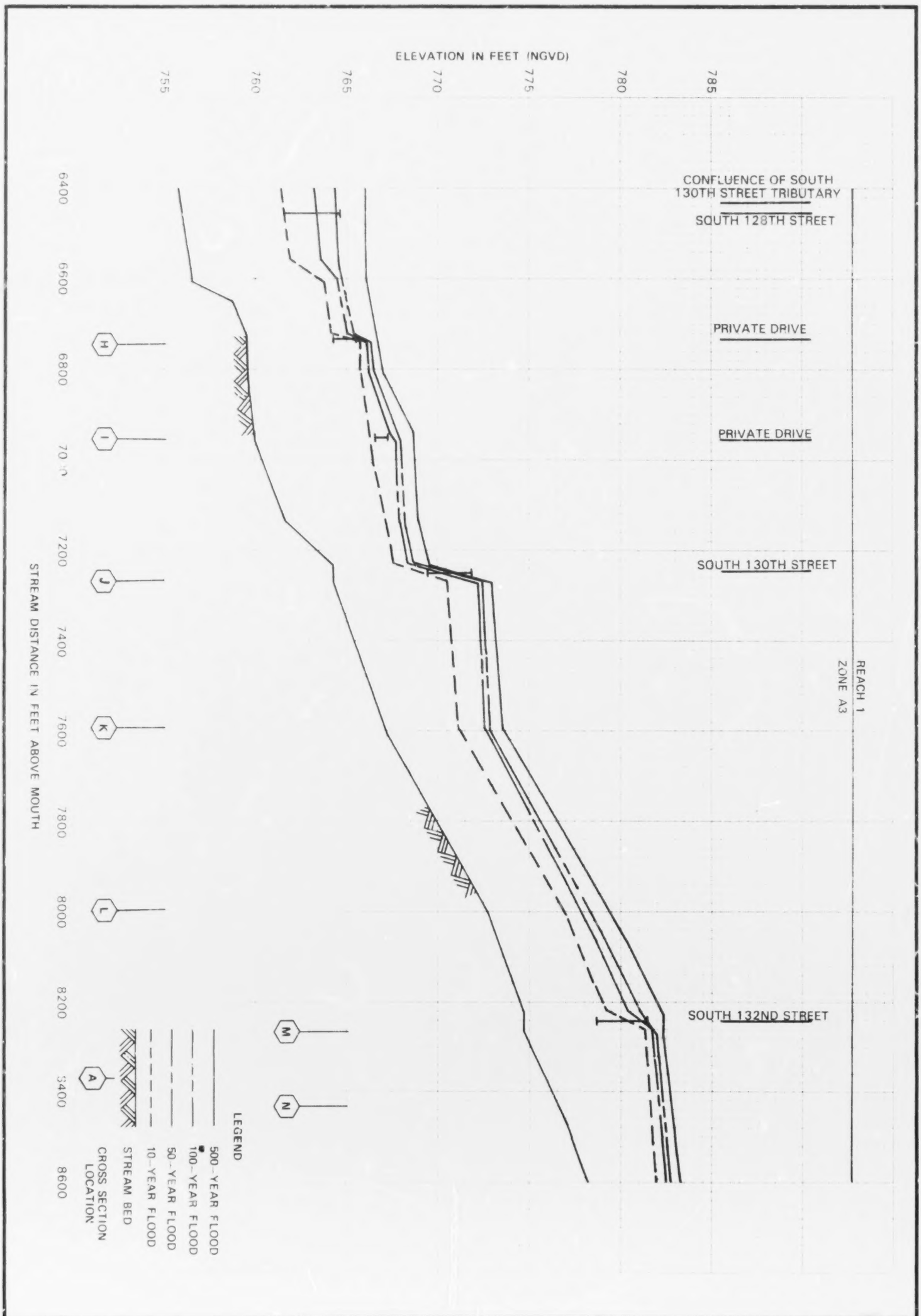


04P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF NEW BERLIN, WI (WAUKESHA CO.)	FLOOD PROFILES WEST BRANCH ROOT RIVER



05P

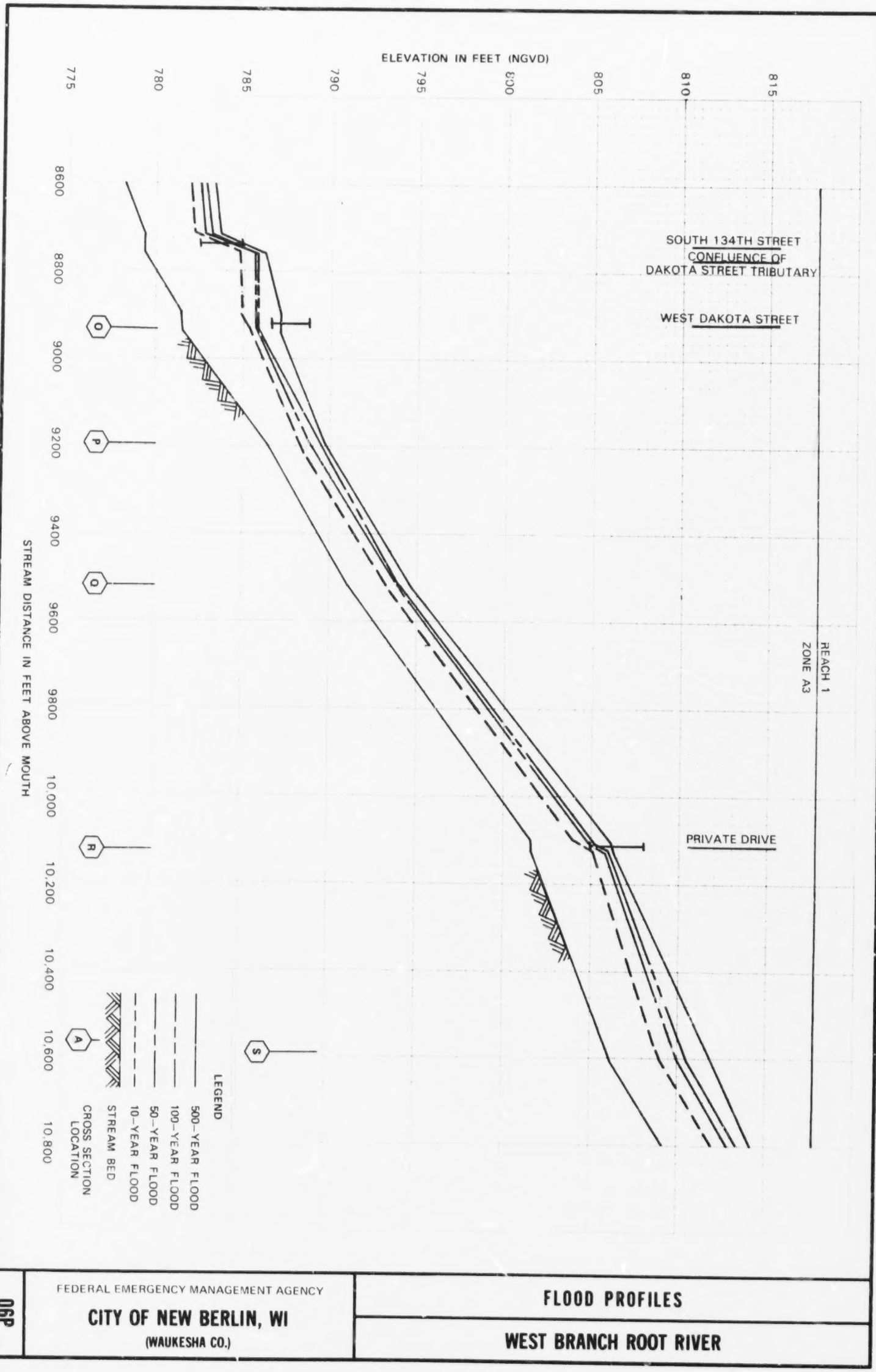
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

FLOOD PROFILES

WEST BRANCH ROOT RIVER



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06P	FEDERAL EMERGENCY MANAGEMENT AGENCY **CITY OF NEW BERLIN, WI** (WAUKESHA CO.)	**FLOOD PROFILES** **WEST BRANCH ROOT RIVER**

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FLOOD PROFILES

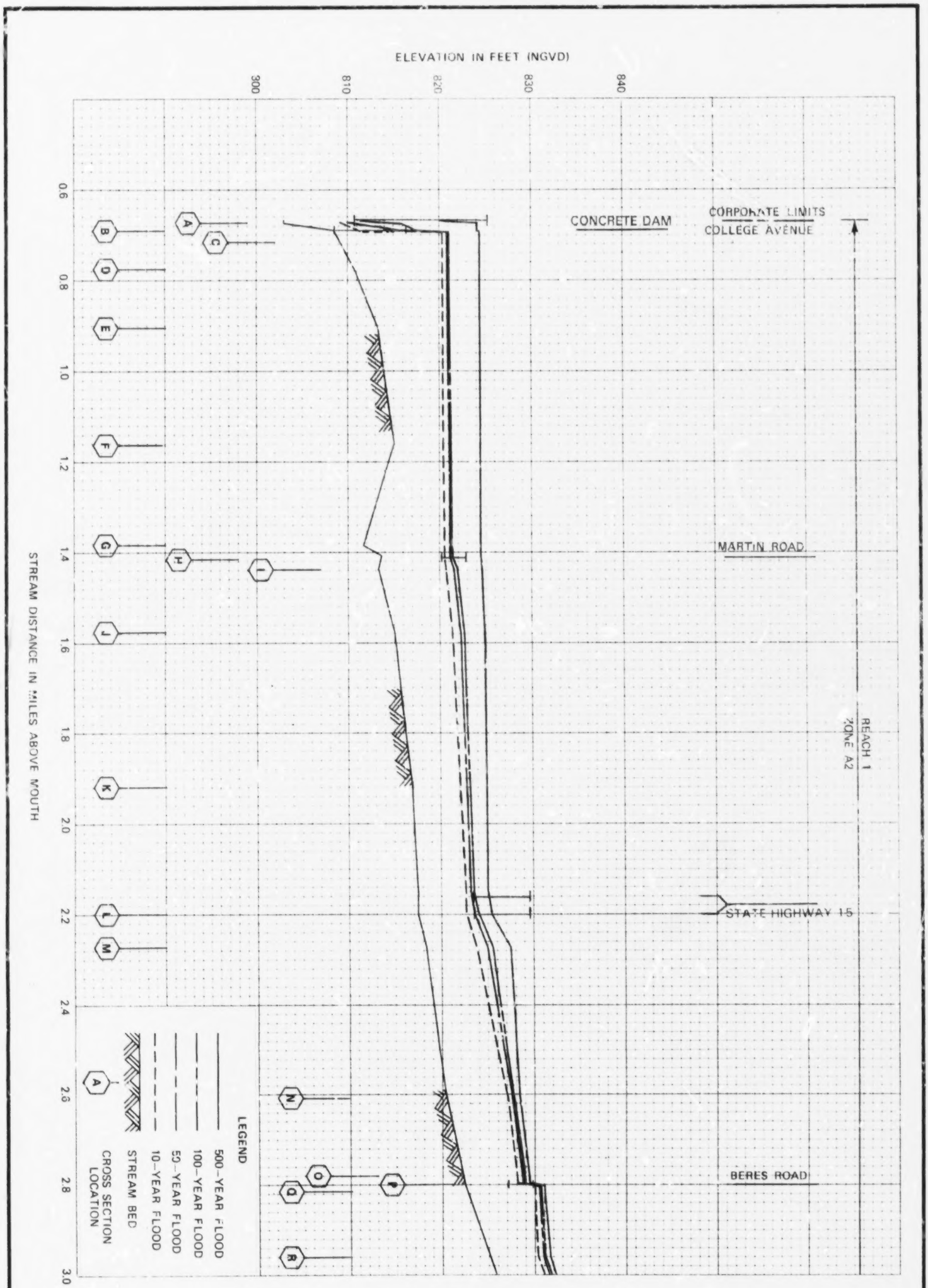
WEST BRANCH ROOT RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

07P



08P	FEDERAL EMERGENCY MANAGEMENT AGENCY **CITY OF NEW BERLIN, WI** (WAUKESHA CO.)	**FLOOD PROFILES** **CALHOUN CREEK**

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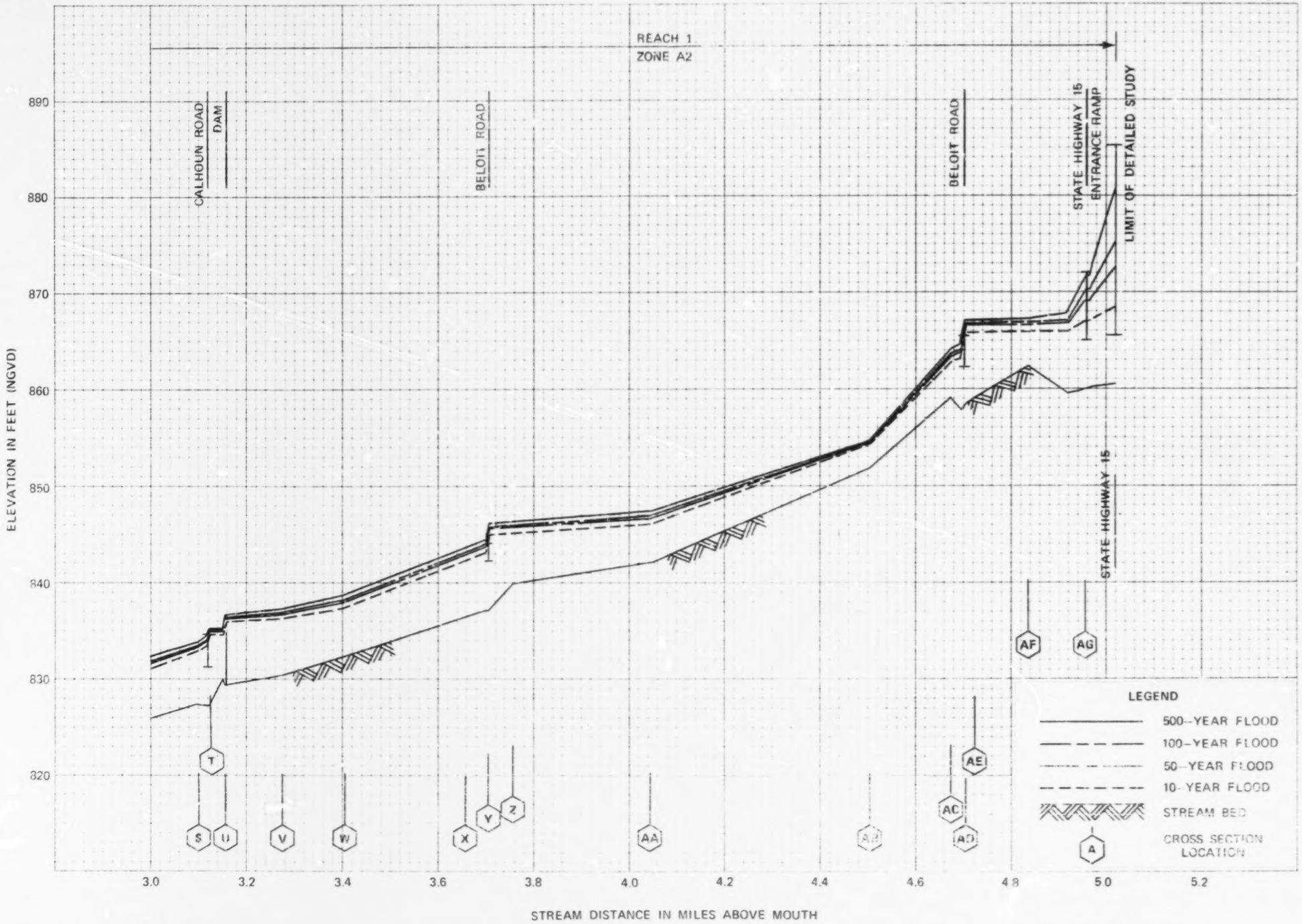

FLOOD PROFILES

CALHOUN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

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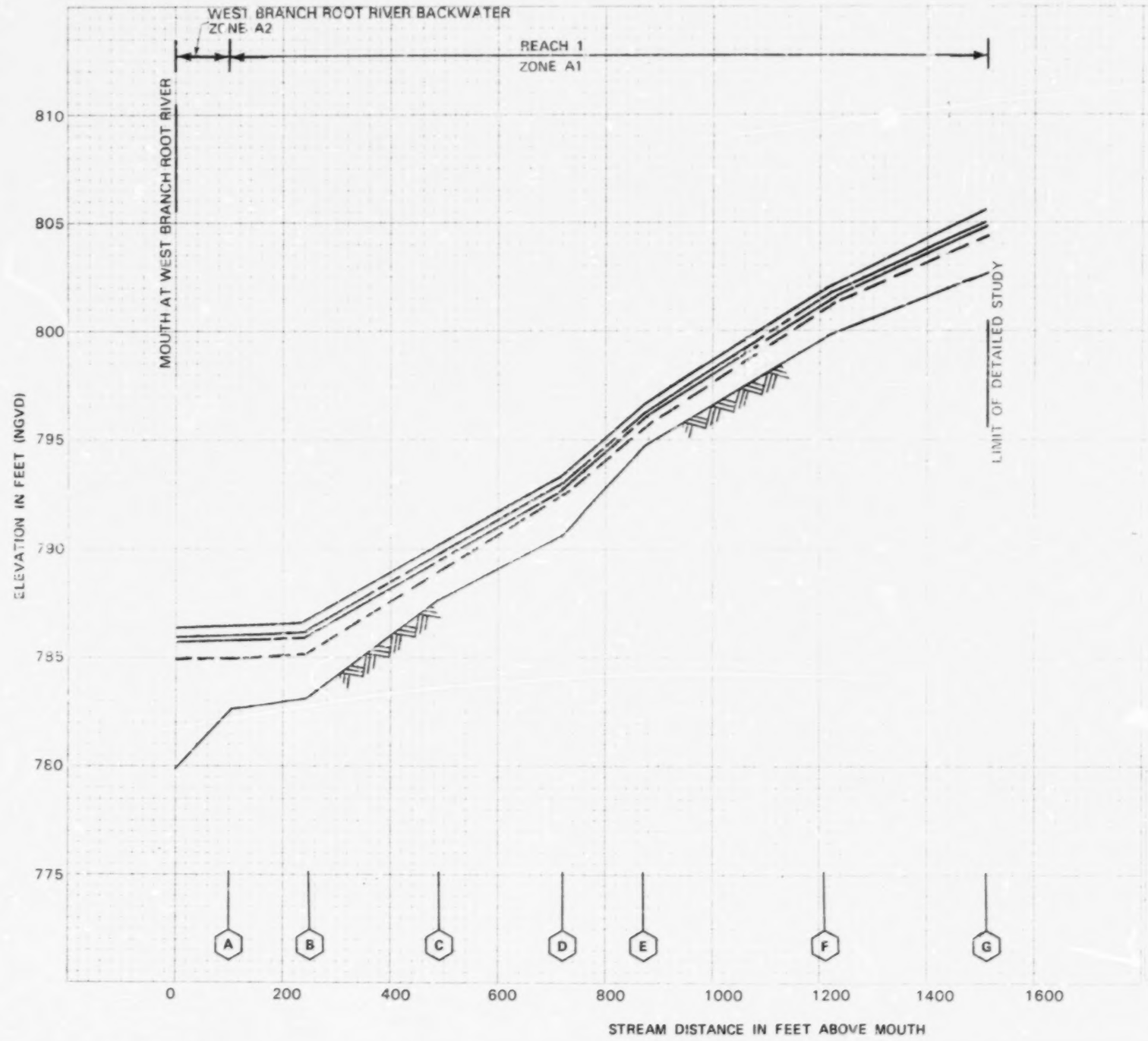

FLOOD PROFILES

DAKOTA STREET TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

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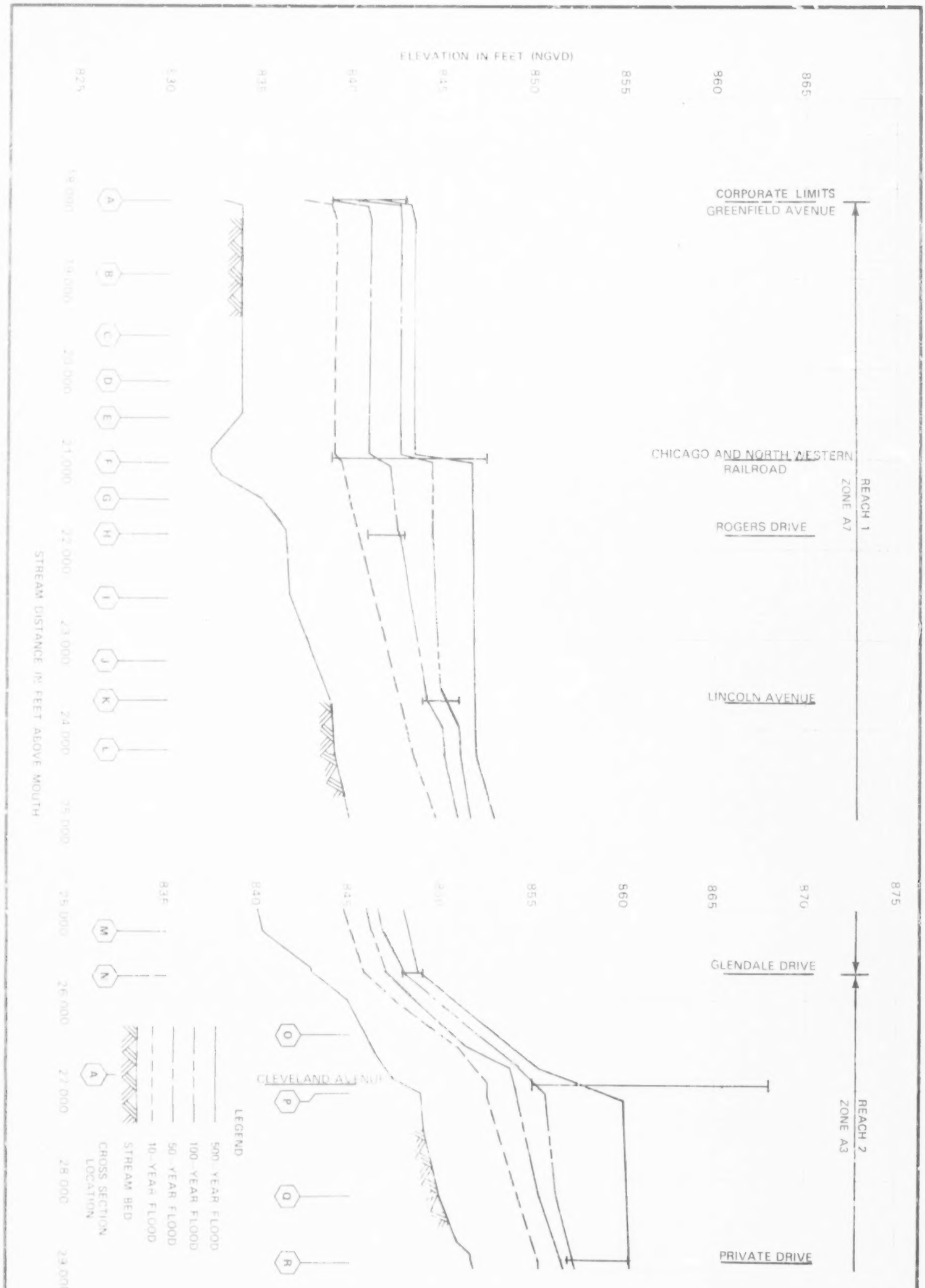
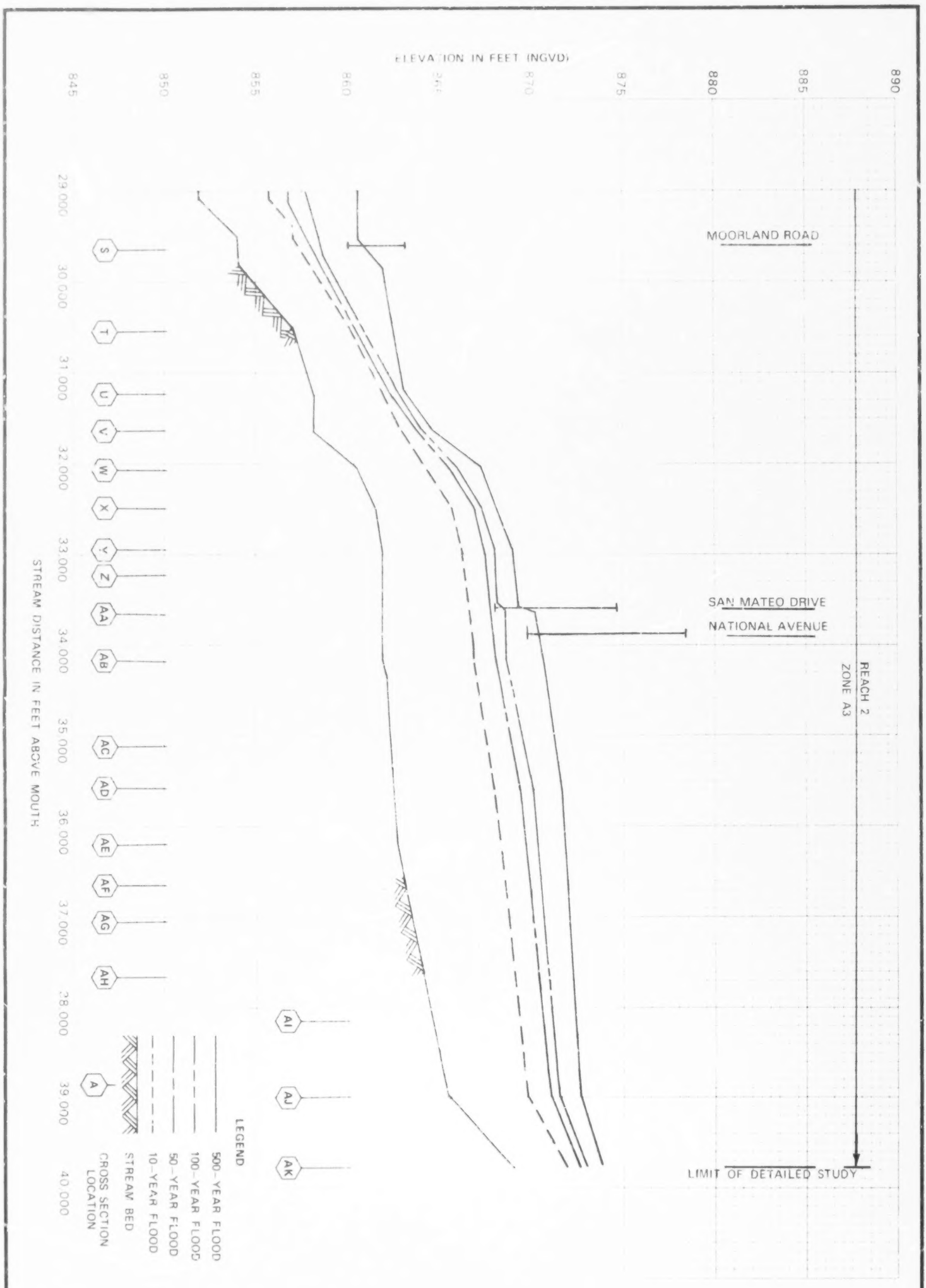
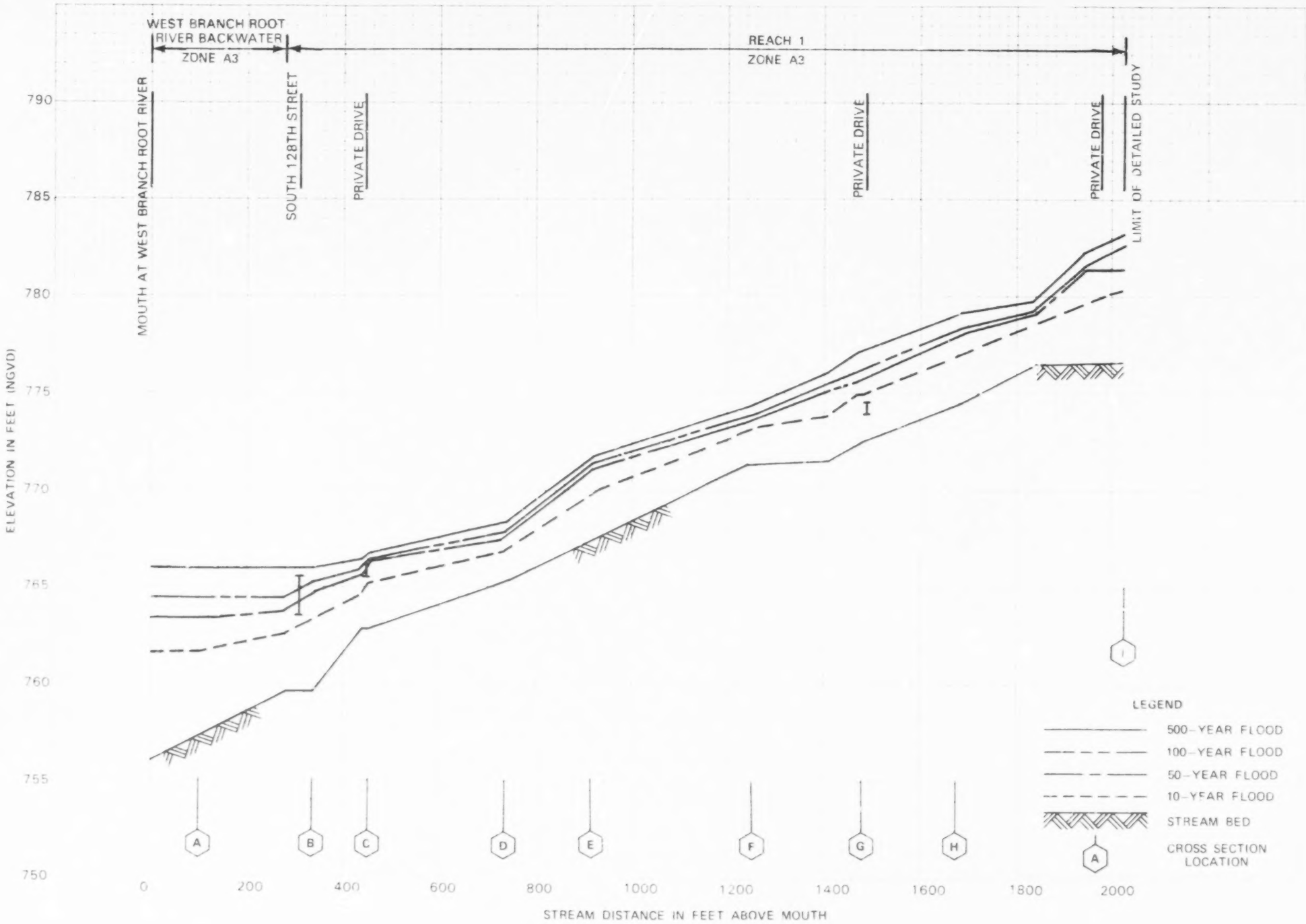


11P	FEDERAL EMERGENCY MANAGEMENT AGENCY **CITY OF NEW BERLIN, WI** (WAUKESHA CO.)	**FLOOD PROFILES** **DEER CREEK**



12P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF NEW BERLIN, WI (WAUKESHA CO.)	FLOOD PROFILES DEER CREEK



FLOOD PROFILES

SOUTH 130TH STREET TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI
(WAUKESHA CO.)

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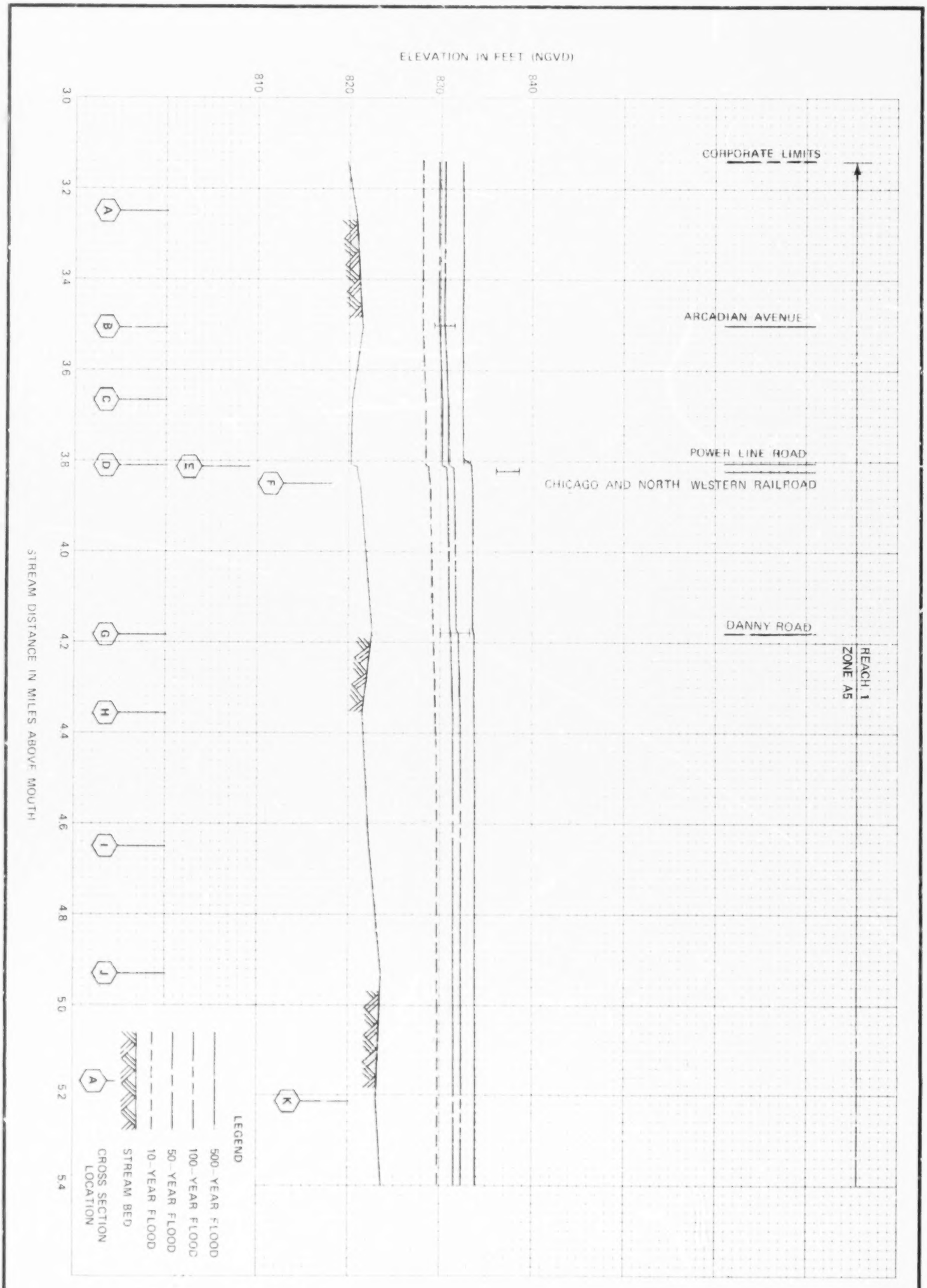
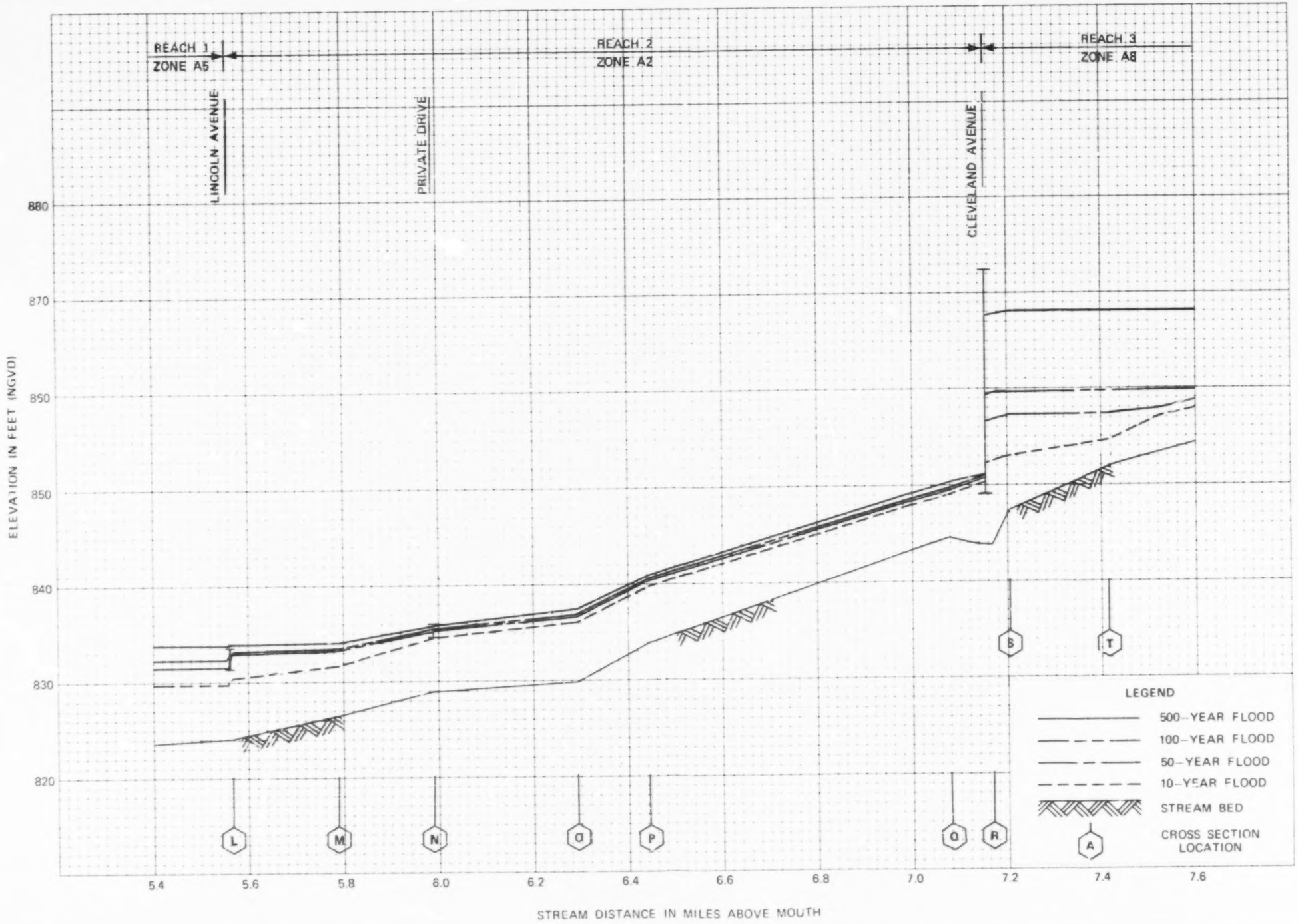


14P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF NEW BERLIN, WI (WAUKESHA CO.)	FLOOD PROFILES POPLAR CREEK



FLOOD PROFILES

POPLAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI
(WAUKESHA CO.)

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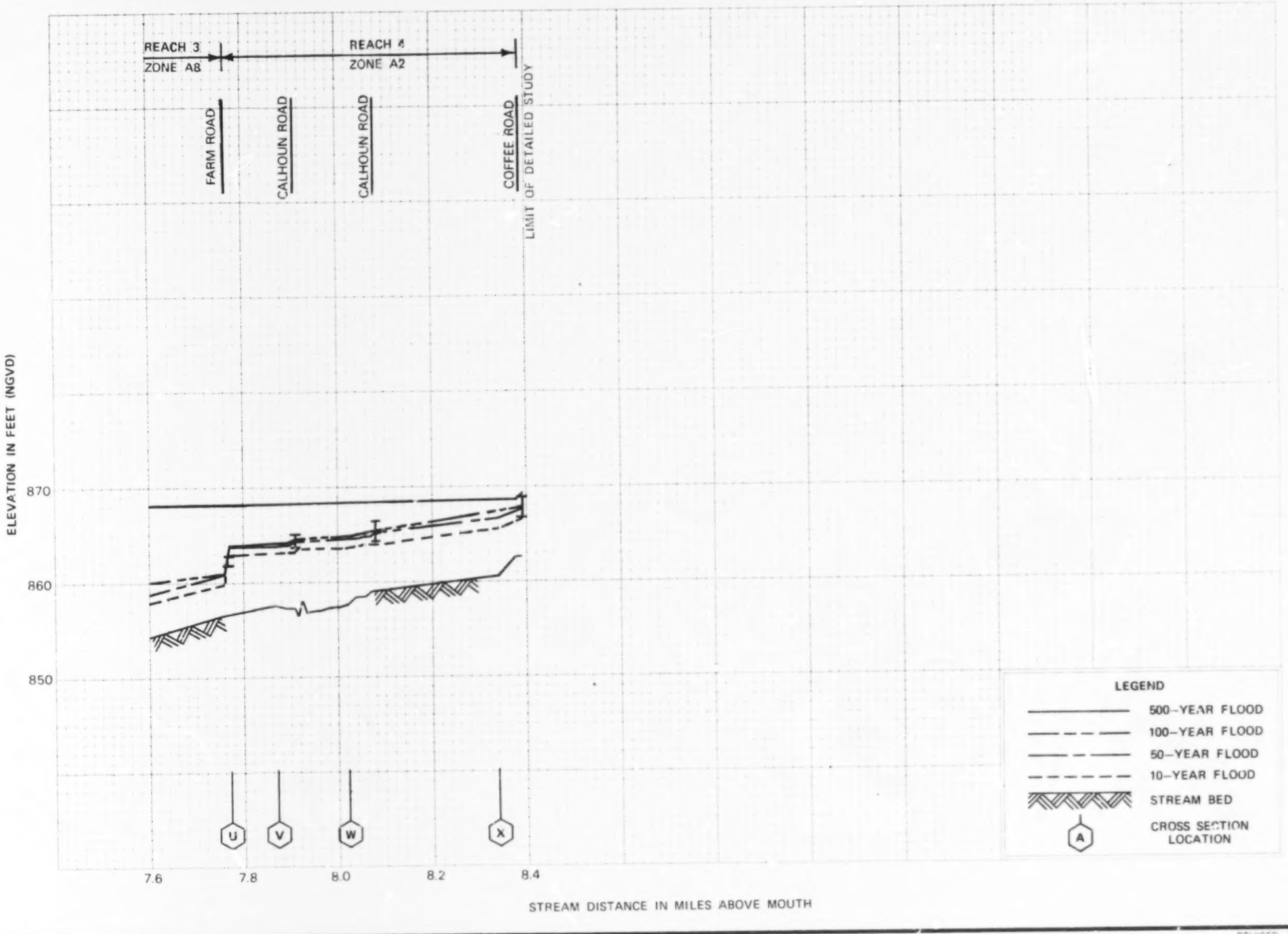

FLOOD PROFILES

POPLAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI
(WAUKESHA CO.)

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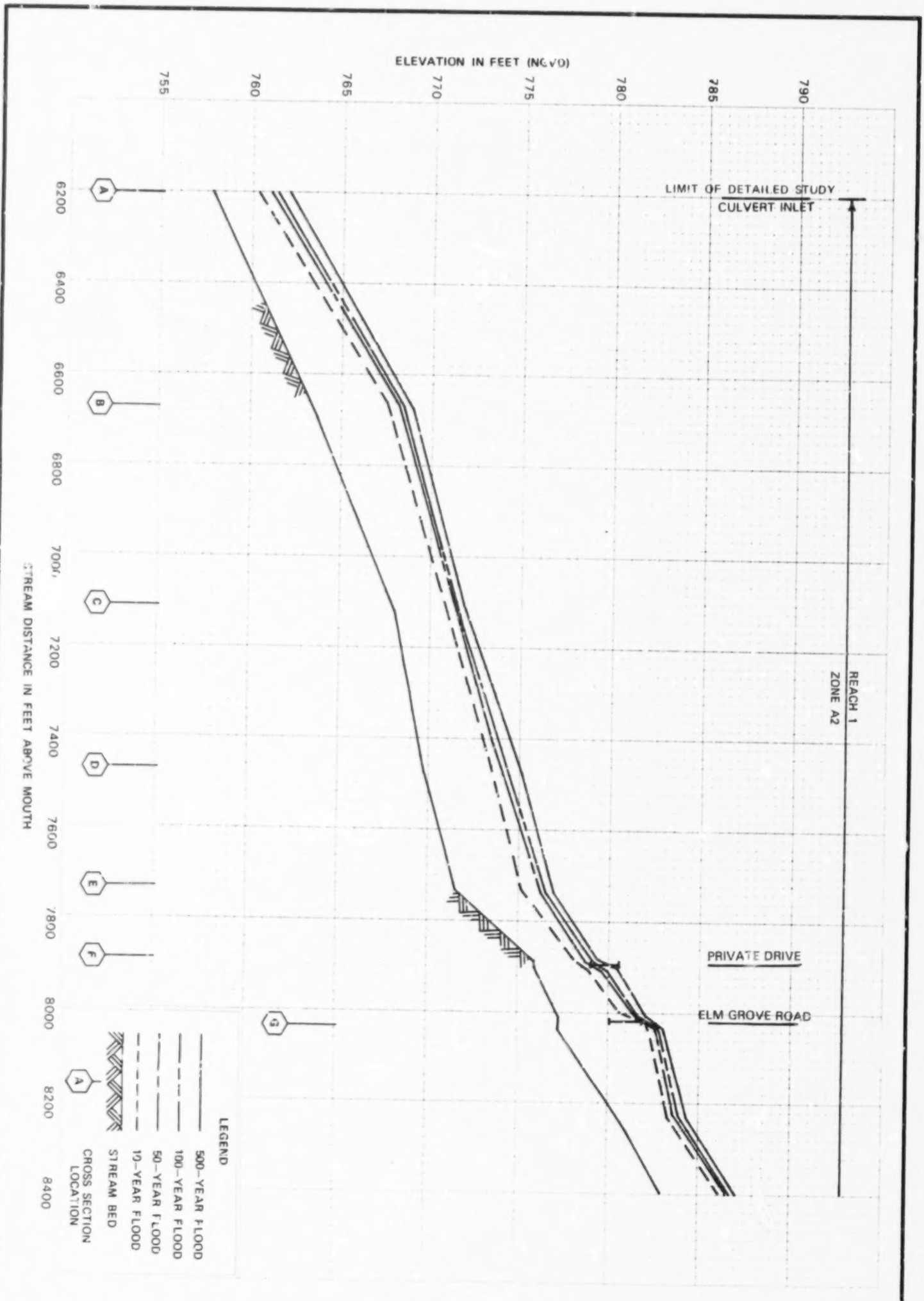
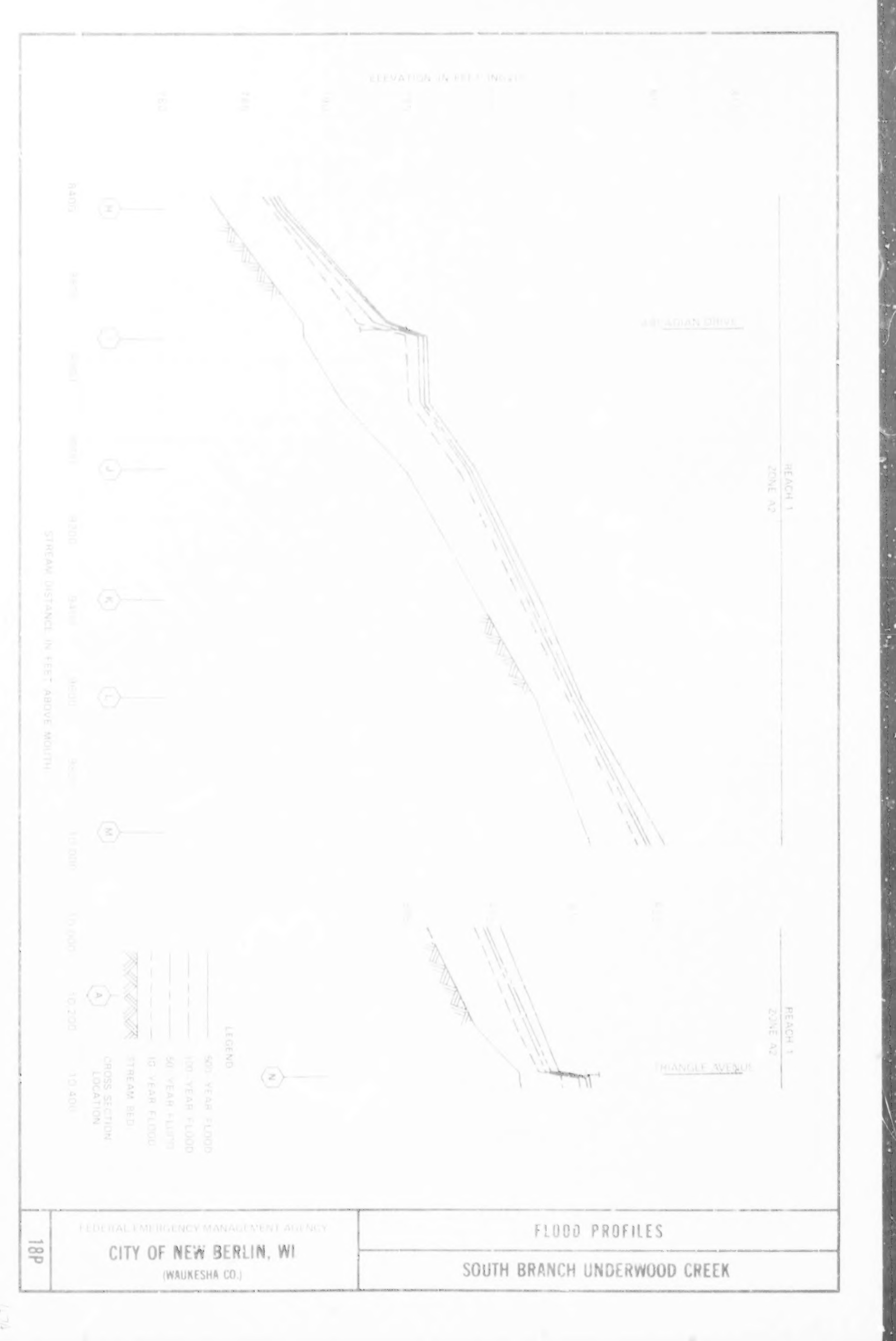


17P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF NEW BERLIN, WI (WAUKESHA CO.)	FLOOD PROFILES SOUTH BRANCH UNDERWOOD CREEK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FLOOD PROFILES

SOUTH BRANCH UNDERWOOD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI

(WAUKESHA CO.)

19P

FLOOD PROFILES

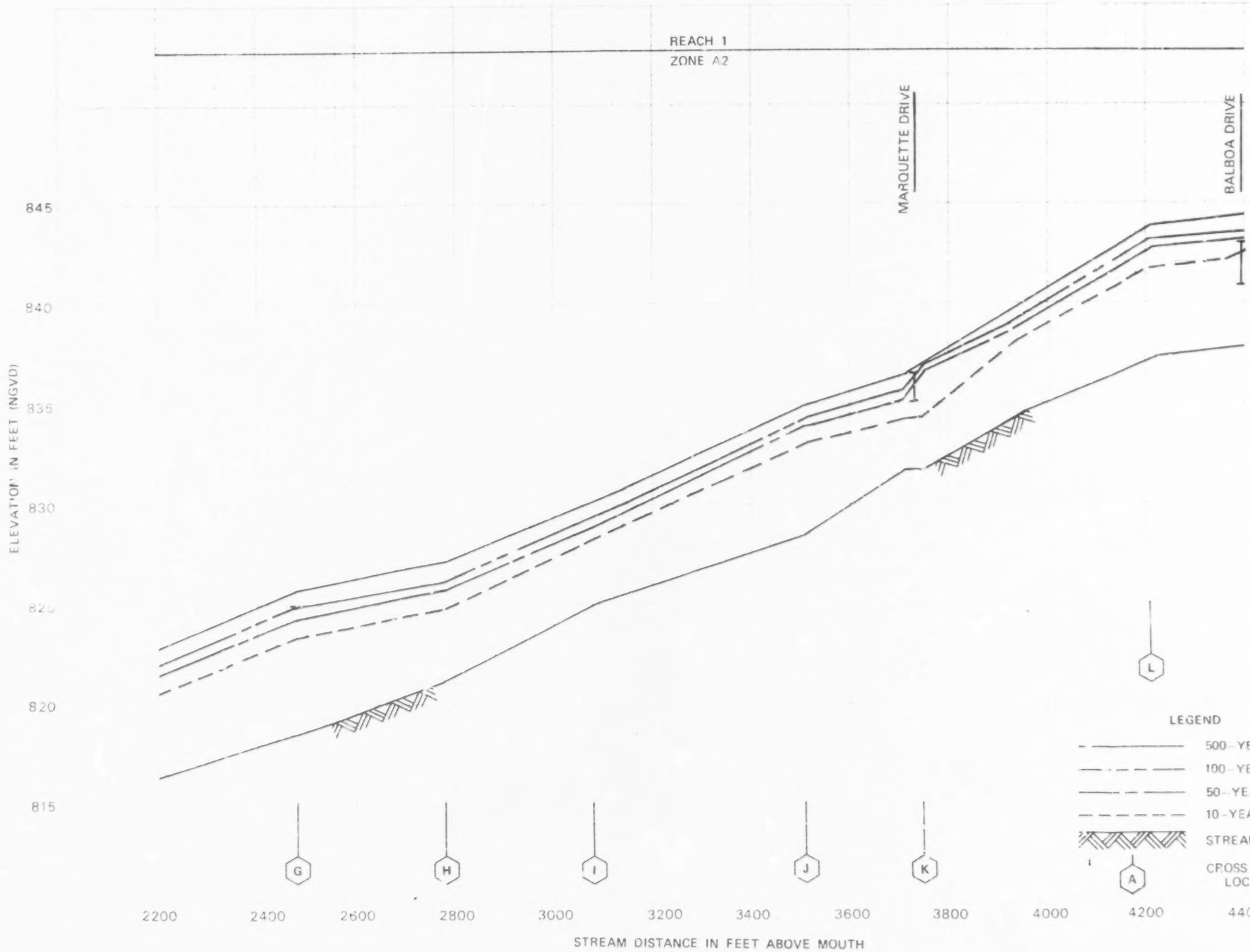
UPPER KELLY LAKE TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI
(WAUKESHA CO.)

20P

REVISED 7-4-88



FLOOD PROFILES

UPPER KELLY LAKE TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF NEW BERLIN, WI
(WAUKESHA CO.)

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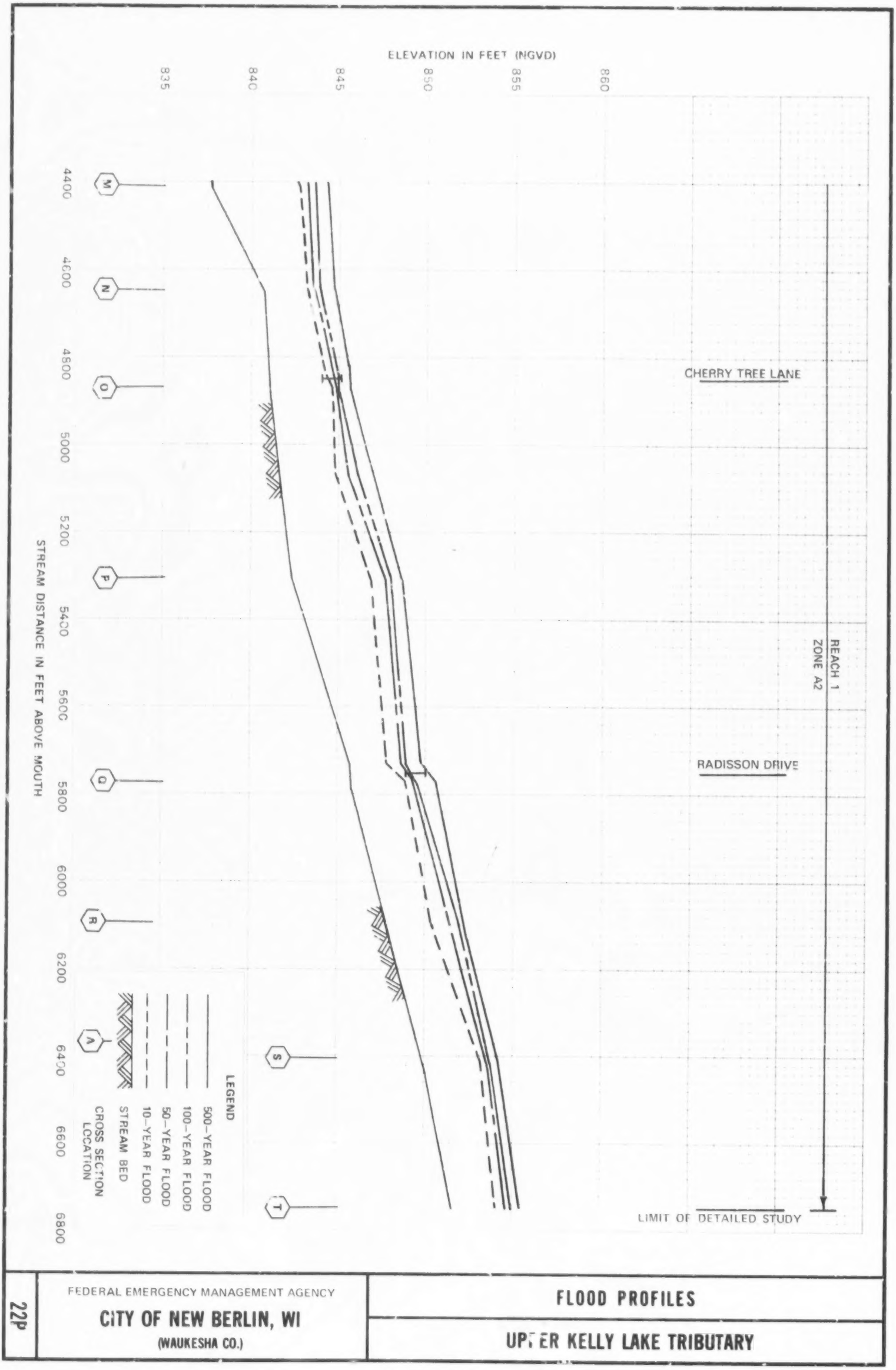

22P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF NEW BERLIN, WI (WAUKESHA CO.)	FLOOD PROFILES UPPER KELLY LAKE TRIBUTARY